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STEEL
The Metalworking Weekly

October 28, 1957
Vol. 141 No. 18

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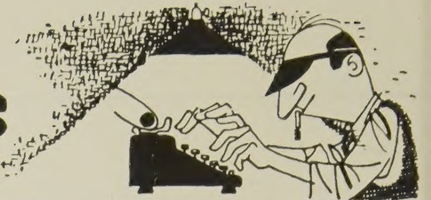
behind the scenes



Spiritual Tizzy

If any gnomes, sylphs, salamanders, or undines turn up in Chicago next week, they're going to find themselves out on a limb—that is, if we care to put any faith in a treatise written some years ago by a hotshot scientist with the impossible name of Philippus Aureolus Theophrastus Bombastus von Hohenheim Paracelsus. The old boy held that there were four elements: Earth, air, fire, and water. Moreover, each element had its own reigning set of spirits, and if you played fast and loose with fire, for example, you could bring a mess of disturbed salamanders about your ears.

But to come back to Sorrento (Oops! That's what comes from overexposure to hi-fi). We mean Chicago: The 39th National Metal Exposition and 2nd World Metallurgical Congress opens in that city on Nov. 4, and so many elements will be represented in the metals and alloys on display the reigning spirits are bound to grow confused. The undines would claim jurisdiction over metals used in pens that write under water; gnomes, naturally, would look for rare earths; salamanders would hover over all the furnaces, and if the sylphs took to the air, particularly over the Union Stockyards, could you blame them for cooking up a curse?

Dig That Metal Selector

We approached STEEL's technical editor, Dr. Allen Gray, with a view toward learning something about metals and their attendant spirits. If there were only four sets in Paracelsus' time, surely there must be many more in these modern days.

"Doctor, in your opinion, what divinity will go to Chicago next week to reign over, say, the various commercial numbers, with corresponding ASTM and SAE designations and composition limits, of the more than 50 aluminum cast alloys?"

"I'm glad you asked me that," the good doctor replied, "because I haven't the faintest idea of what you're talking about. However, if you were to ask me about STEEL's Metal Selector for Standard Alloys, which appears as a ten-page insert in this week's Metal Show Issue, I could give you a story that would astound more than 50,000 metalworking executives and engineers."

"Tiens, parbleu, and heavenly days! Do you think this page might attract 50,000 metalworking executives and engineers?"

"Certainly not. I merely took the opportunity to mention the number of interested persons who will gather in Chicago for the Metal Show, and who will be much aroused by our Metal Selector. You know, we worked on the selector for more than five months."

Last year's Metal Selector drew an unprecedented response from readers and was judged the best original research in 1956 in the 19th Annual Editorial Competition sponsored by *Industrial Marketing*.

It was about time to change the subject, so we asked him about other features in this week's issue. "Reduction!" he exclaimed. "We have a special report on direct reduction of iron ores. Everybody's talking about it. Downright fascinating."

We felt a better subject, for downright fascination, might be the new bag silhouettes under which the modern miss foolishly conceals her naturally delightful lines, but Dr. Gray permitted himself a mild (but academic) snort. We dismissed the silhouettes in bags (the proofreader could kill us dead if he makes a sly transposition in that line) and pressed for more information on what direct ore reduction will mean to steel technology, but the only answer we got was: "Turn to Page 180."

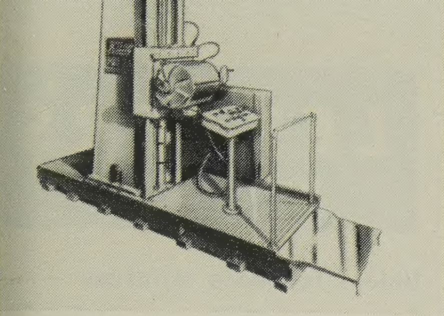
You Can Do It

Everybody else was drinking, so Llewellyn picked up a handful of Scrabble letters. He had 8 As, 8 Ts, 2 Hs, 2 Ss, 2 Ds and 1 F, C, E, P, and G. He employed them to make an acceptable sentence, like this: "- - - - - - - - - - - - - - - -'- - - -'- - - - - - -!"

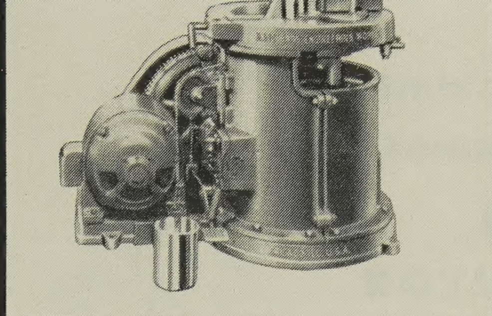
Things like that drive us nuts.

Shrdlu

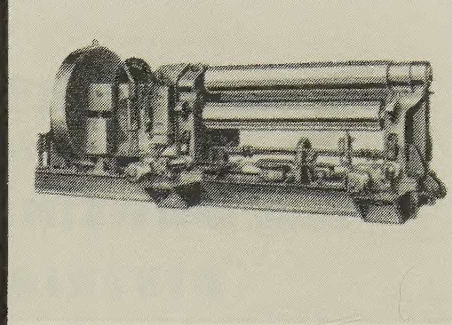
(Metalworking Outlook—Page 113)



KLING MILL-ALL. "Cuts faster with a finish that is better than most commercially-milled finishes."



KLING POWER BAR BENDERS. "15 bends a minute for $1\frac{1}{4}$ inch round is easy..."



KLING PLATE BENDING ROLL (PINCH TYPE). "Work is better controlled. Flats are held to a minimum."

Kling

Workhorses

Speak the language

Production Men

Love to Hear

The men who operate Kling Machines get the performance facts straight from the Workhorses' mouths. They're relaying these facts to us... and they're the kind of facts any production man would love to hear... so we're reproducing a few typical samples on these pages... in the hope they'll whet your appetite for more. They will add up to...

Better Work... Faster Work... Easier Work Lower Costs

Ask the Men Who Know KLING BEST

You'll find KLING machines in "the Best of Companies"... and the production men in these companies are Kling's best friends. They know Kling performance first hand... they have the facts right out of these Workhorses' mouths! Why not ask us to send you the names of Kling users near you... see a Kling Workhorse in action... you'll hear the language every production man loves to hear! And mail the coupon now... for Bulletins on any or all of these Kling Workhorse machines.

You'll find Kling Workhorses in "the Best of Companies."

Bethlehem Steel... B & O Railroad

Ford Motor... Kaiser Steel

Link Belt... Jos. T. Ryerson

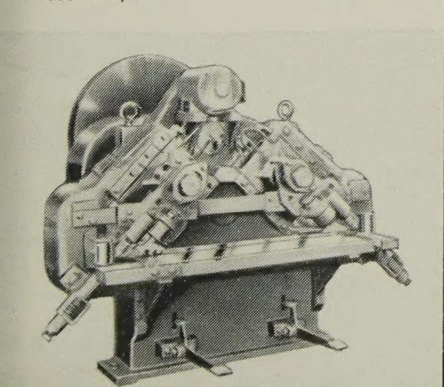
U. S. Steel... Douglas Aircraft

Westinghouse... Lockheed

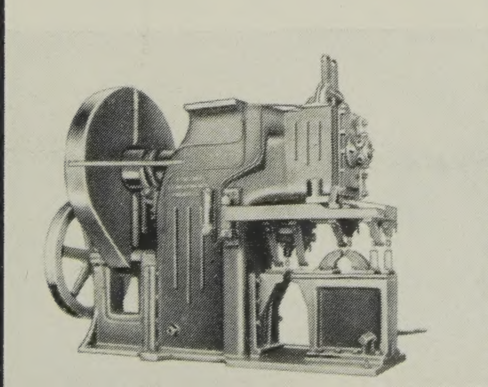
Allis Chalmers... Reynolds Metals

Pearl Harbor Shipyard... etc.

KLING DOUBLE ANGLE SHEARS. "Saves 75% of Labor compared to our old method ... less burr, too."



KLING PUNCHES. "Our 2 have run 16 hours a day for 20 years."



Kling Bros. Engineering Works
1320 N. Kostner Ave., Chicago 51, Ill.

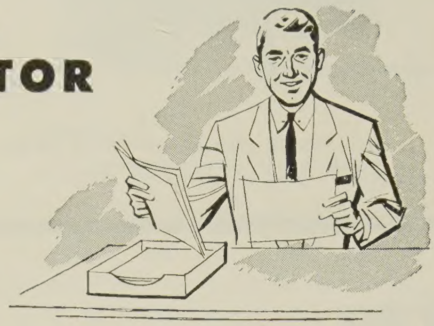
I'd like to know more about the following Kling Machines . . . send me Catalog Bulletins.

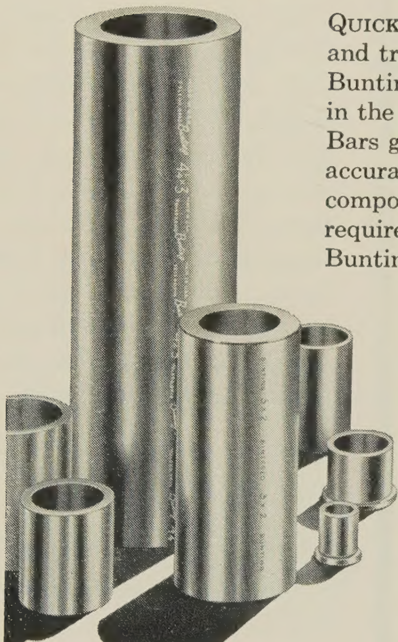
- ☐ Combination Shear Punch and Coper
- ☐ Plate Rolls
- ☐ Punches
- ☐ Shears
- ☐ Angle Rolls
- ☐ Bulldozers
- ☐ Friction Saws
- ☐ Rotary Shears
- ☐ Power Bar Benders
- ☐ Mill-All

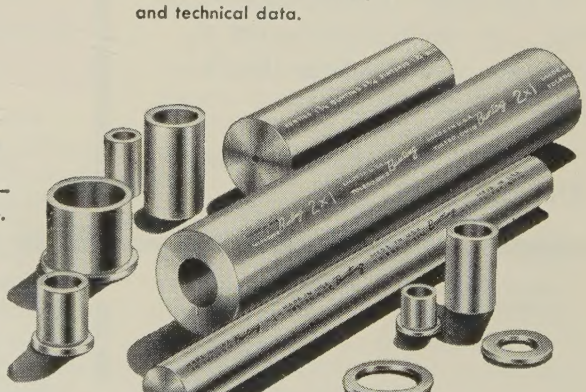
☐ Also, names of companies near me whom I can contact for on-the-job performance results.

(attach to your letterhead)

Export Distributor: Simmons Machine Tool Corp., 50 E. 42nd St., New York 17
Exclusive Canadian Distributor: Brown-Boggs Foundry & Machine Co., Ltd., Hamilton, Ont.







LETTERS TO THE EDITORS

Unions Influence Inflation

The stories of inflation published i recent months are both interesting an disquieting.

Your story, "Prices Rise When Wage Outrun Productivity" (Sept. 30, Pag 45), is good but does not go far enough

The present inflationary trend stem from the desire of union leaders to se cure a greater increase in wages (an more fringe benefits) for their union than other labor leaders could secure.

For that purpose, unions have accu mulated huge funds, from which pro longed strikes can be financed.

In my opinion, inflation can be halte only by a law that makes strikes un popular. That law consists of one sen tence: An employee who goes on strik shall be considered to have left hi (or her) employment voluntarily an shall be considered a new employe when seeking employment anywhere.

This law shall apply to authorize strikes, unauthorized (wildcat) strike and to sit-down strikes. Such a law would wipe out seniority, and all privi leges that are based on length of servic

I have been told that it would pen alize the worker. However, the presen situation penalizes the man with a fixe income.

How can we make Congress pass such a law? Letters to members of Congre and letters to associations such as th National Association of Manufacturer will turn thoughts in the right direction

W. Trink
R.D.
Ohiopyle, Pa

Contracting of Missiles

In the Metalworking Outlook of Aug 5 (Page 49), an item headline read "Shift to Missiles Helps IT&T," an you report that the International Tele phone & Telegraph Co. is heavily in volved in missile work.

But, in your Oct. 7 issue, you do no mention this company in the Missil Scoreboard chart included in the story "Missiles in Quantity Soon?" (Page 119).

Which article is correct, please?

Allen E. Wat
132 Palos Verdes Blvd
Redondo Beach, Calif

• *Both articles are correct. The Missile Scoreboard showed only prime con tractors. IT&T is not a prime or majo systems contractor. Its work comes through subcontracts, as is the case wit*

(Please turn to Page 12)

Versatility and quicker setups cut grinding costs for toolrooms and short run production

Landis 10" x 20" and 10" x 24" Universal Cylindrical Grinders feature Microsphere Wheel Spindle Bearings for maximum accuracy, high finishes and dependable operation.

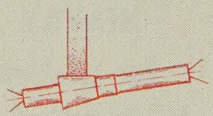
LANDIS

precision grinders

LANDIS TOOL COMPANY / WAYNESBORO, PENNA.

Grinding jobs which can be done on this machine


traverse and infeed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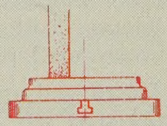
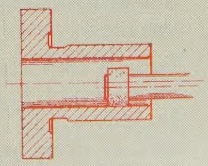

face and angle


internal—straight and angle

LETTERS

(Concluded from Page 10)

hundreds of U. S. firms working on the missiles programs.

IT&T's interest in missiles is important. Its four main defense industries currently count Air Force contracts as 40, 61, 16, and 39 per cents of their 1957 sales results. Two of their divisions will get 100 per cent of their 1957 sales from defense contracts in general.]

Article to Field People

We feel your article, "Brazing Alloy Selector" (Oct. 7, Page 162), is well done. We would like 25 reprints to distribute to our field people, since articles such as this make excellent reference material.

W. T. SanSouci
Manager
Brazing Product Sales
United Wire & Supply Corp.
Providence, R. I.

Down-to-Earth Presentation

Please send a few copies of your article, "Suppliers' Outlook Mixed" (Sept. 9, Page 63). We found it quite interesting and compliment you on a down-to-earth presentation.

L. J. Hardke
Purchasing Agent
Whirlpool-Seeger Corp.
St. Joseph, Mich.

Values Chip Form Pictures

Please send 12 copies of the article, "How To Get More from Machine Tools" (Sept. 23 insert). We feel this article with its photographic display of chip forms will be of great value. We wish to distribute copies to our methods and time study personnel, machine shop foremen, and lead men.

Melvin Spicer
Methods & Standards
Chain Belt Co.
Los Angeles

Article to Management

Your Program for Management article, "Dealing with Workers" (Sept. 16, Page 119), is of extreme interest to me. I would appreciate receiving several copies to present to management.

J. J. Valentine
Director of Research
Mercast Mfg. Corp.
LaVerne, Calif.

Request from Argentina

We have found the article, "New Ways To Fight Corrosion" Part I (Aug. 26, Page 68) interesting. We would appreciate a reprint of it as well as one of Part II (Sept. 2, Page 158) which discusses organic and metallic coatings.

Harry A. Allevin S.R.L.
Import-Export Representatives
Buenos Aires, Argentina

Research in Business

May I have a reprint of the article, "Research . . . Threshold to the Future" (July 15, Page 93). As a teacher of marketing research, I am interested in the role of research in business. Your article will be helpful to me and of interest to my students.

H. C. Barksdale
Associate Professor of Marketing
School of Commerce, Accounts, & Finance
New York University
New York

CALENDAR
OF MEETINGS

Oct. 28-31, Atomic Industrial Forum and **American Nuclear Society:** Annual meetings and 1957 Trade Fair of the Atomic Industry, Plaza Hotel and New York Coliseum, New York. Information: Atomic Industrial Forum, 3 E. 54th St., New York 22, N. Y. Executive manager: Charles Robbins.

Oct. 28-31, National Industrial Packaging & Handling Exposition: Convention Hall, Atlantic City, N. J. Information: Hanson & Shea Inc., One Gateway Center, Pittsburgh 22, Pa.

Oct. 29-31, Truck Body & Equipment Association: Annual convention and exhibit, Sherman Hotel, Chicago. Association's address: 401-402 Washington Board of Trade Bldg., Washington 6, D. C. Executive manager: Arthur H. Nuesse.

Oct. 30-Nov. 1, National Association of Aluminum Distributors: Annual meeting, Camel Back Inn, Phoenix, Ariz. Association's address: 1900 Arch St., Philadelphia 3, Pa. Secretary: R. Bruce Wall.

Oct. 31-Nov.1, American Zinc Institute Inc.: Meeting of the galvanizers committee of the steel industry, Pick-Ohio Hotel, Youngstown. Institute's address: 60 E. 42nd St., New York 17, N. Y. Secretary-treasurer: J. L. Kimberley.

Oct. 31-Nov. 2, National Metal Trades Association: Annual convention, Conrad Hilton Hotel, Chicago. Association's address: 337 W. Madison St., Chicago 6, Ill. Secretary: Charles L. Blatchford.

Oct. 31-Nov. 3, National Tool & Die Manufacturers Association: Annual meeting, Edgewater Beach Hotel, Chicago. Association's address: 907 Public Square Bldg., Cleveland 13, Ohio. Executive secretary: George S. Eaton.

Nov. 1-3, Metal Treating Institute: Annual meeting, Sheraton Hotel, Chicago. Institute's address: 271 North Ave., New Rochelle, N. Y. Executive secretary: C. E. Herrington.

Nov. 2-8, American Society for Metals: Annual meeting, Palmer House, Chicago. Society's address: 7301 Euclid Ave., Cleveland 3, Ohio. Managing director: William H. Eisenman.

Nov. 2-8, National Metal Exposition and Congress and World Metallurgical Congress: International Amphitheatre, Chicago. Information: American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio. Managing director: William H. Eisenman.

Nov. 3-8, Society for Nondestructive Testing: Annual meeting and international conference on nondestructive testing, Hotel Morrison, Chicago. Society's address: 1109 Hinman Ave., Evanston, Ill. Secretary: Philip D. Johnson.

Nov. 4-5, Wire Reinforcement Institute Inc.: Annual fall meeting, Safari Hotel, Scottsdale, Ariz. Institute's address: National Press Bldg., Washington 4, D. C. Managing director: Frank B. Brown.

Nov. 4-6, American Institute of Electrical Engineers: Machine tool conference, Hotel Schroeder, Milwaukee. Institute's address: 33 W. 39th St., New York 18, N. Y. Secretary: N. S. Hibshman.

Nov. 4-6, American Institute of Mining, Metallurgical & Petroleum Engineers: Institute of Metals Division meeting, Morrison Hotel, Chicago. Institute's address: 29 W. 39th St., New York 18, N. Y. Secretary: E. O. Kirkendall.

STEEL
October 28, 1957

Metalworking Outlook

Mess in Missiles?

"We are so far behind the Russians in missile technology that it will take a major breakthrough to catch them." That's the consensus of industry leaders attending a meeting of the Association of Missile & Rocket Industries, a new trade group. Major topics of conversation: Interservice rivalry in missiles, Defense Department spending cutbacks and small business' potential in missiles. Small company representatives were outspoken about the Pentagon's failure "to give us the chance to show what we can do." Three of the more recent contracts for missilework have been to large firms—Western Electric Co. ($104.2 million for Titan and Thor guidance systems), Aerojet Corp. ($55.7 million for the Titan propulsion unit), and Remington-Rand Div. of Sperry Rand Corp. ($24 million for Univacs for the Titan).

The Aircraft Cutbacks

Boeing Airplane Co. says Air Force curtailment of monthly payment to defense contractors may force it to slow production drastically. Chance Vought Aircraft Inc. says its work force probably will be reduced by about 1000 by yearend, to stay in line with federal economies. An eastern aircraft firm stopped work on a $32-million contract in July because of slow payments. The contract will be resumed in January when money is paid again. Asks the company: How much money will be lost in stopping, then starting that contract?

Calling All Inventors

Do you have an idea for a tunneling machine which can bore through earth at 6000 ft per hour? That's just a sample of 387 technical problems, vitally affecting national defense, which need solution. If you're interested in the list, get in touch with Commerce Department's National Inventors Council.

New Magnetic Steel

Westinghouse Electric Corp. announces a magnetic steel with the ability to magnetize in four directions. Called Cubex steel, the product will be used in the magnetic cores of transformers, motors, and other electrical equipment. Steel now used in cores can be magnetized in only two directions. Although the new material is still in the laboratory stage, it will probably be used in a few special commercial applications within the next few months.

Prefab Housing Grows

Look for prefabrication to account for half of all housing starts within the next five or ten years, Investment Banker Frederick K. Trask Jr. told

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Market Outlook—Page 257

delegates to the Prefabricated Home Manufacturers' Institute. He predicts housing starts of at least 2 million a year by 1965. Despite a 20 per cent drop in housing starts this year, production of prefabs is holding its own. Production this year will be between 90,000 and 100,000 house packages.

Big Business in Curtain Walls

Production of curtain walls for architectural purposes is at an annual rate of $100 million—600 per cent above the 1950 figure—and will soar to $325 million by 1965, predicts Kawneer Co., Niles, Mich., one of the manufacturers. The firm foresees these technical developments: A curtain wall package providing finished interior and exterior wall surfaces upon installation; panels with the radiant heating function built in; integrated utility panels to include plumbing and electrical conduits.

Personal Consumption To Rise, if—

A 50 per cent increase in personal consumption of goods and services by 1965 is forecast by President Philip M. Talbott of the U. S. Chamber of Commerce. He sees the gain on the assumption of a $600-billion gross national product by that date. More emphasis on marketing is needed, he says.

Kefauver Resumes Hearings

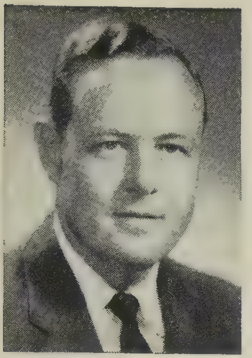
A. B. Homer, president of Bethlehem Steel Corp. and third highest paid man in U. S. industry, is earning only as much as he did in the 1940s and less than he did in the 1930s, figuring the falling value of the dollar and rising income taxes. Mr. Homer answered questions about his income when he appeared last week before Sen. Estes Kefauver's (D., Tenn.) Senate Antitrust & Monopoly Subcommitee. Of the 18 highest paid industrialists, 11 are from Bethlehem, three from General Motors Corp., two from Ford Motor Co., and one each from E. I. du Pont de Nemours & Co. and United Merchants & Manufacturers Inc.

UAW Strike Fund Mounts

When 1958 auto talks begin next spring, the United Auto Workers strike fund could nearly double the $25 million amassed for 1955 parleys. Without a special assessment, the fund already stands at about $25 million. A $5 monthly assessment, as in 1955, could quickly push the total to $40 million or $50 million.

Automotive Straws in the Wind

Reynolds Metals Co. says 1958 autos, trucks, and buses will use 400 million lb of aluminum, 15 to 20 per cent more than the 1957 vehicles did . . . American Motors (Canada) Ltd. expects to resume assembling cars in Canada . . . Goodyear Tire & Rubber Co. is in volume production of rubber air springs for autos.



October 28, 1957

Know Your Materials

A thorough study of the evolution of metals is made each year by STEEL's editors at the time of the National Metal Congress & Exposition.

The results of this year's study are interpreted in a concise article (Page 162) and reported in a Metal Selector (following Page 168), which details the compositions, properties, forms, and applications of several hundred metals.

Changes in materials often take place with little fanfare. So we feel obligated to point out their significance.

Included among the American Iron & Steel Institute's standard specifications are 188 types of alloy and H-steels. A few new steels have been added, but some 50 have been dropped in two years because of declining usage—either because of nonavailability (key alloying elements couldn't be obtained) or because users had switched to other grades.

The number of stainless steel specifications is growing because of new requirements in the aircraft, atomic reactor, missile, automotive, architectural, and other fields.

Casting users are becoming more specification conscious. They find a wide range of types available in gray iron, malleable, steel, and nonferrous metals. Their properties and applications cover a wide range. Steel castings, for instance, are approaching the 300,000 psi range. Magnesium alloyed with thorium will take temperatures up to 800° F.

A new aluminum alloy with a bright finish is adaptable for auto bumpers, store window trim, and appliances. The standard copper alloys have been supplemented with many special and proprietary alloys.

Those and other new and improved metals offer one of the few remaining avenues open for cost saving.

Saving is not a matter of switching from a good material to a cheaper one. It requires choosing the metal that is fabricated economically and is most suitable for the job.

Irwin H. Such
EDITOR-IN-CHIEF

New facts on inventory costs revealed by IRON AGE survey

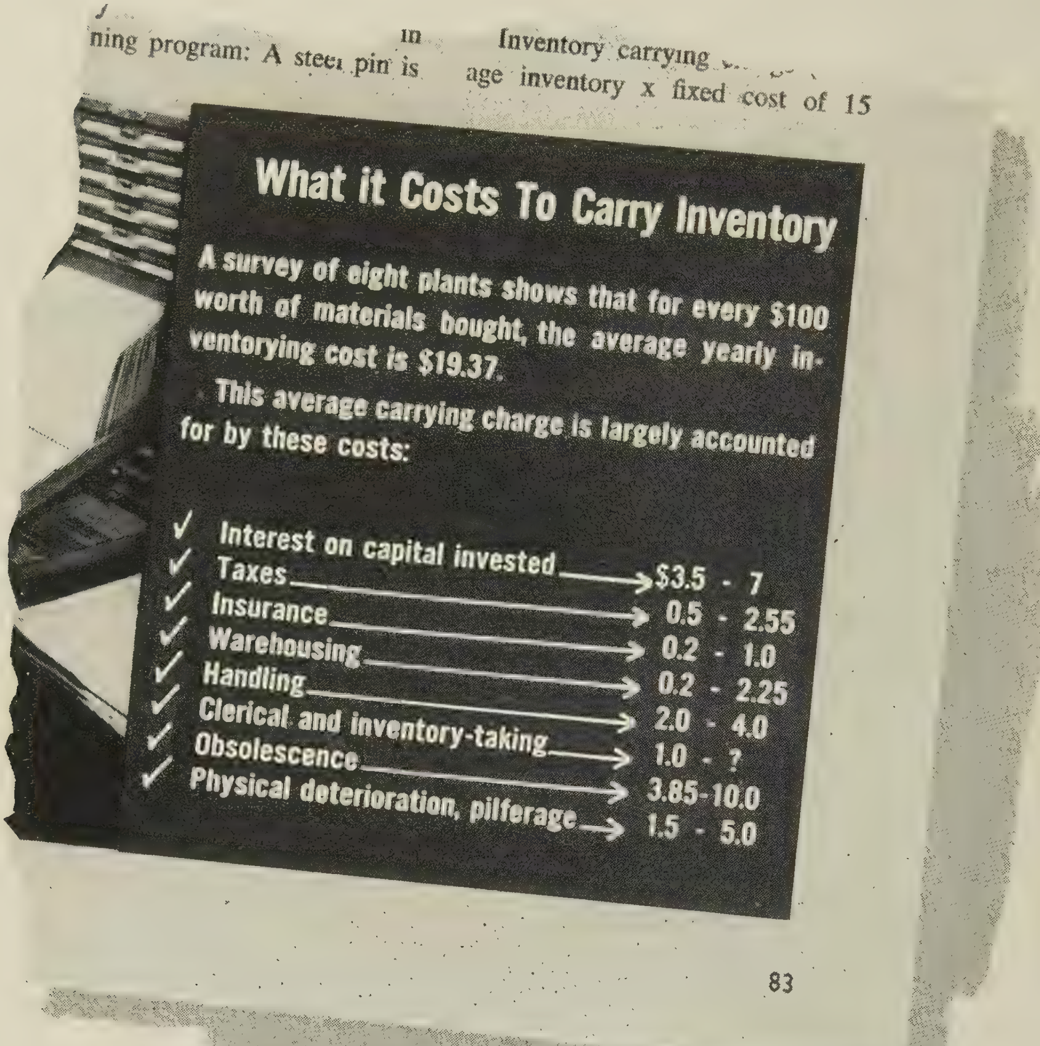


Chart courtesy The Iron Age.

Here's help on steel inventory costs . . . In these days when working capital is tight and interest rates are high, it's especially important not to let inventory take dollars you can use elsewhere. You can save money on steel inventory costs by letting Ryerson carry the inventory for you. It's already here, at Ryerson—in the nation's largest stocks of steel. And Ryerson has the organization to deliver what you want when you want it. For immediate steel service, call the Ryerson plant near you.

RYERSON STEEL

Principal products: Carbon, alloy and stainless steel — bars, structurals, plates, sheets, tubing · aluminum, industrial plastics, machinery, tools, etc.

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK · BOSTON · WALLINGFORD, CONN. · PHILADELPHIA · CHARLOTTE · CINCINNATI · CLEVELAND DETROIT · PITTSBURGH · BUFFALO · INDIANAPOLIS · CHICAGO · MILWAUKEE · ST. LOUIS · LOS ANGELES · SAN FRANCISCO · SPOKANE · SEATTLE

PLUS Factors . . . Overbalance MINUS Factors . . .

PLUS

1. PLENTIFUL GOODS.
2. HIGH RATE OF SHIPMENTS.
3. GOOD QUARTER FOR AUTOS.
4. RISING ELECTRIC EQUIPMENT.
5. EARNINGS FROM ACQUISITIONS.
6. STEADY CONSTRUCTION.
7. IMPROVED PRODUCTION METHODS.
8. EMPHASIS ON COST CONTROL.
9. HIGHER PRICES.
10. NO MAJOR STRIKES.

MINUS

1. RISING LABOR COSTS.
2. HIGHER MATERIAL COSTS.
3. BOOSTED SHIPPING CHARGES.
4. START-UP EXPENSES.
5. EXPANSION COSTS.
6. DROP IN DEFENSE SPENDING.
7. HIGHER R & D COSTS.
8. SOME WEAKENING IN DEMAND.

So Metalworking's Third Quarter Profits Rise . . .

SELECTED MANUFACTURERS	1957	1956
Alco Products Inc.	$1,084,000	$882,000
Bell & Howell Co.	760,939	551,379
Beryllium Corp.	167,156	163,026
Buffalo Forge Co.	526,229	416,915
Carborundum Co.	948,673	990,663
Caterpillar Tractor Co.	9,888,997	13,527,966
Cleveland-Cliffs Iron Co.	4,963,050	3,700,209
Continental Can Co. Inc.	14,537,000	13,771,000
Cooper-Bessemer Corp.	1,562,000	1,362,000
Diamond Alkali Co.	1,485,379	2,348,410
Diamond T Motor Car Co.	295,460	322,631
Douglas Aircraft Co. Inc.	8,036,183	7,774,972
Driver-Harris Co.	62,222	141,539
Eastman Kodak Co.	25,434,611	22,214,888
Eaton Mfg. Co.	1,893,727	1,566,276
Federal-Mogul-Bower Bearings Inc.	2,064,000	1,846,000
Ferro Corp.	263,876	400,478
Garrett Corp.	518,700	1,241,400
General Electric Co.	55,165,000	47,863,000
General Instrument Corp.	169,599	119,916
General Steel Castings Corp.	924,688	719,307
Gillette Co.	7,355,253	6,682,722
Hanna (M. A.) Co.	6,181,451	4,952,410
Hussman Refrigerator Co.	564,975	913,587
Johns-Manville Corp.	5,733,000	6,967,861
Minneapolis-Honeywell Regulator Co.	4,143,615	4,995,083
Monarch Machine Tool Co.	208,225	235,350
Monsanto Chemical Co.	8,810,000	6,838,000
National Lead Co.	12,630,392	12,537,724
Parker-Hannifin Corp.	461,506	335,706
Pittsburgh Forgings Co.	408,231	62,538
Pittsburgh Screw & Bolt Corp.	388,404	270,248
Pullman Inc.	3,701,716	2,244,288
Revere Copper & Brass Inc.	1,924,238	2,019,528
Reynolds Metals Co.	9,157,788	6,441,278
Rockwell Spring & Axle Co.	2,612,459	1,060,079
Union Carbide Corp.	34,000,965	33,578,938
Union Twist Drill Co.	451,400	434,400
U. S. Pipe & Foundry Co.	2,626,383	2,899,251
Vertol Aircraft Corp.	284,811	858,612
Worthington Corp.	2,367,112	2,338,480

Steelmakers Do Well, Too

SELECTED STEELMAKERS	(First nine months)* 1957	1956
Alan Wood Steel Co.	$710,178	$2,041,754
Allegheny Ludlum Steel Corp.	9,725,952	9,647,024
Colorado Fuel & Iron Corp.	12,200,223	9,081,359
Continental Steel Corp.	2,216,785	2,199,774
Crucible Steel Co. of America	5,820,877	8,597,020
Inland Steel Co.	43,146,628	35,490,480
Jones & Laughlin Steel Corp.	37,970,000	32,269,000
Lone Star Steel Co.	9,439,862	6,891,540
Republic Steel Corp.	73,039,194	55,838,400
Youngstown Sheet & Tube Co.	31,814,556	24,904,000

*3rd quarters aren't comparable because of strike.

But Outlook Less Promising . . .

METALWORKING has three reasonably profitable quarters under its belt, but it may have to tighten up for leaner earnings in the last three months.

Steelmakers' hopes for a fourth quarter as profitable as the first three have been dampened by a scattering of operating cutbacks. Many companies are running at below 80 per cent of capacity.

Downtrend?—Additional factors making the last quarter profit picture look less promising: 1. Hand-to-mouth buying. 2. Cautiousness. 3. Generally lower backlogs. 4. More start-up expenses. 5. Rising overhead costs. 6. Aircraft cutbacks. 7. Still some weakness in price structures.

Upturn?—But some signs point to a better profit picture. Orders are trickling in at a somewhat faster rate, especially those going to automotive suppliers. Price increases will be in effect for the full three months. Inventories have been cut enough so that increased demand can mean an immediate pickup in orders. Christmas buying will help. Some automotive suppliers are predicting record fourth

quarters (though others report reduced backlogs).

Some industries, including steel, can show a better profit per sales dollar at slightly below capacity operations. Reason: Old equipment used to get full capacity has a narrow profit margin.

Or Leveling Off?—Most firms expect the profit curve to flatten, but not decline, in the fourth period. On the whole, this will be a good year. Some firms expect to set records. Here's how the last quarter earning trend looks:

Autos—Good turnover in stock of '57 models gives the period an initial boost. Orders from dealers for '58 models cause automakers and suppliers to be optimistic.

Aircraft—A noticeable decline in earnings begins to show as firms start the phasing out of models hit by defense cutbacks.

Nonferrous—Look for a continuation of the present level. An improvement in business in general would have an immediate beneficial result because of users' low inventories.

Steel—The long rise has peaked and ebbed. But the year will be better than 1956 because: 1. The strike hurt '56 earnings. 2. The first half of '57 reached high levels. 3. Higher prices and lower cost of scrap will help.

Capital Goods — A "wait until next year" attitude is common (see STEEL, Oct. 21, pp. 42-43).

Appliances — A slight fourth quarter upturn is likely as dealers stock up for Christmas buying.

Office Equipment—Watch for a continued rise. Backlogs in some cases are not as high as they were, but they are still at healthy levels.

For '58—Manufacturers had a 17 per cent return on net worth in 1947, but only a 13.9 per cent return last year. Selling prices are not increasing as rapidly as labor and other costs. Prospects are that the long-term erosion of profits will continue next year.

Caster Spends $1 Million

American Cast Iron Pipe Co., Birmingham, will open a $1 million centrifugal steel casting facility in mid-1958. The production building contains 100,000 sq ft. Size of the machine shop will be tripled.

Builder Hits Slump Talk

"WHEN the machine tool business is good, it is plenty good, and when it is bad, it is still pretty good."

Jerome A. Raterman, outgoing president of the National Machine Tool Builders' Association, uses those words to take issue with the industry's feast-or-famine reputation.

"We have always had fluctuations in volume in the machine tool business, and yet we have gone right on earning a profit," he declares.

How's Business? — Talking to association members at last week's annual meeting in French Lick, Ind., Mr. Raterman, president, Monarch Machine Tool Co., Sidney, Ohio, estimated shipments for 1957 at $800 million. "The figure has been exceeded in only four of the last 13 years—and three of those four years reflected national defense demand due to the Korean crisis."

Mr. Raterman admitted that the dip in new orders is greater than he foresaw last spring. In September, they came to $28.9 million. The average for July, August, and September was about $43 million a month.

Viewpoint — Such results are good or bad, depending on how you look at them. Compare them with peak years, and they're bad. Mr. Raterman suggests comparison with other peacetime periods. "From 1946 to 1950, and 1955 and 1956—seven years during which the industry had practically no carryover from defense emergencies—our production averaged $434 million a year, an amount considerably below what we can expect today, if new orders continue at the present rate," he stated.

He cited these reasons for confidence:

1. Figures on age and obsolescence of machine tools on plant floors indicate an enormous potential replacement market.

2. Beyond that market lies demand for machine tools needed in expansion projects which have been delayed but not abandoned.

3. The rate of research and product development within the machine tool industry.

New NMTBA Officers

President
ALFRED V. BODINE
Bodine Corp. president

1st vice president
RALPH J. KRAUT
Giddings & Lewis president

Compare Your Job Relationships

HERE are 18 jobs selected at random from 81 included in an American Home Laundry Manufacturers' Association study. It's designed to show how members ranked jobs within their wage structure. The survey included 18 firms.

Note the variance in the relative position of each job within each firm's wage structure, compared with the industry average. None of the 18 companies' job relationships coincided exactly with the average.

The significance of the study, say consultants at Edwin Shields Hewitt & Associates who assisted in the research, is that each firm can analyze its own "out-of-line" jobs. Small variations are normal. Where variations occur which are wide, management must analyze its situation to determine whether the relative job position is justified.

Example—Companies B and C appear to be rating their electricians "A" too high. A local shortage of electricians or some other circumstance might justify the relationship. Or the firms' job evaluation methods might be faulty, and they are paying too high a rate.

Wage Paid Expressed as Percentage of Each Firm's Average Straight Time Pay

Job Description	Industry Average	Company A	Company B	Company C	Company D	Company E
Janitor	80%	78%	75%	73%	83%	81%
Paint booth cleaner	86	82	80	75	103	80
Loader	90	95	86	82	88	112
Receiving checker	93	90	98	98	95	96
Visual inspector	95	92	84	97	95	90
Stock chaser	98	85	†	106	95	82
Receiving inspector	99	88	95	102	100	99
Dinger	103	119	†	128	†	110
Drill press operator	104	111	†	100	122	100
Burrer	105	108	112	81	112	97
Shear (set up & operate)	106	99	103	116	85	120
Milling machine operator	108	114	109	102	128	97
Welder, arc or acetylene	109	†	†	136	103	103
Boring machine	110	116	112	98	127	105
Punch press, setup man	111	106	115	117	109	132
Electrician "A"	113	113	135	136	113	102
Grinder, rotary-surface	117	113	112	117	134	110
Tool, die, or gage maker "A"	128	119	121	136	138	114

Source: American Home Laundry Mfrs. Assn.
†No jobs in this classification.

Job Rating: Profit Saver

HOME LAUNDRY equipment makers' widely varying wage scales aren't exceptional. Metalworking abounds with examples—causing unequal labor costs and profit losses.

Why the variations? Geography and related special circumstances account for some. But those causes are becoming less important. Improper job rating increasingly is the culprit.

Rule of Thumb—Experts in job rating suggest giving a higher weighting—50 per cent—to skill (education, experience, initiative, ingenuity); a higher weighting—25 to 35 per cent—to responsibility (for equipment, materials, and safety of others); and a lower weighting—15 to 25 per cent—to physical effort and working conditions.

To update their job rating methods, companies are breaking down each basic category into several factors, as above. They're establishing point systems for better comparisons of jobs.

Writing the Job—National Metal Trades Association, which does job rating for member firms, uses 11 factors and a point system of five degrees for each factor. "But writing the description of the job to be rated," says NMTA Commissioner George Earl, "is equally important." (See Page 122 for sample.)

That's especially important with a new job. Many firms have found their rating methods are obsolete because technology changes the duties of a job or creates a completely new one. Major shortcoming: Too few factors to "slot" a new job accurately into the wage structure.

Advice — Guard against union pressure to overemphasize the "responsibility" factors in new jobs involving expensive equipment, possible costly production losses, and safety of others. Here are two considerations:

1. How well protected is the equipment with safety devices, such as automatic shutoffs, which limit the employee's responsibility?
2. How much ingenuity, as opposed to normal attentiveness to a few rules and details, does the job require?

Keep Current—Industrial rela-

tions people differ over details used in job rating, but they're unanimous in this: Once you've rated your jobs, don't expect your standards to last forever. How often you must re-rate depends on these changes since the last review: The number of wage increases and other concessions to labor; the number of new or modified jobs created; shifts in production levels, which create different tasks for workers.

If kept up to date, job rating can: Provide an accurate method of evaluating new or modified jobs; avoid wage inequities and, consequently, labor grievances; help keep your labor costs competitive.

Job Description

Don't spare the details. Take this sample for a toolmaker, Class B:

"Lay out, construct, alter, and repair a variety of tools, including ordinary combination, blanking, piercing, drawing, bending, and forming dies; box and stand type drill jigs; milling and other fixtures for general type machining operations, plus location and profile gages where design is available but ordinary development work is required. Visualize finished job, make necessary mathematical calculations, and select allowances for spring, shrinkage, lapping, grinding, scraping, fitting, and finishing. Recognize and report blueprint errors for correction (such as improper angles, radiuses, and materials) which would prevent economical production. Perform difficult and exacting machining operations requiring a wide variety of setups and methods to maintain close tolerances, as well as skilled benchwork involving filing, scraping, grinding, lapping, fitting, assembling, and adjusting to insure satisfactory performance. Make tool tryouts, detect faulty operation or defective material, and correct trouble."

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, Ohio.*

Adhesive-bonded brake lining (left) was one of earliest metalworking applications. Adhesive used to bond printed circuit (center) must withstand hot solder bath at 550° F. Curtain wall panel (right) is gaining popularity

Adhesive Markets Multiply

Metalworking is the fastest growing customer of this rapidly expanding industry. Other markets and new bonding techniques insure greater growth

"SINCE 1947, adhesive sales have grown tenfold," states Bernard Gould, manager of market development, Rubber & Asbestos Corp., Bloomfield, N. J.

Over 100 manufacturers sell over 1000 types and have an annual volume of over $100 million. At least 15 new firms have cropped up the last two years.

Cars First—Car builders were first to find a metalworking use for adhesives, says Minnesota Mining & Mfg. Co., Detroit. Top fabrics, upholstery, and running board mats were bonded on early autos.

Cycleweld Div., Chrysler Corp., began bonding brake linings in 1948. All Chrysler cars have used them since 1950. Other automakers followed suit. Cycleweld also bonds clutch plates, tractor power take-offs, and washing machine parts.

Other automotive uses: Truck bodies, door panels, weather strip, trim, carpet, and sound deadener pads.

Aircraft Biggest—The aircraft industry uses high strength adhesives to bond wings and helicopter rotor blades, to attach skins, and to make spars, webs, and other heavy members. Furane Plastics Inc., Los Angeles, reports that epoxy-phenolics, having 7000 psi tensile strength and 10,000 psi compressive strength, are being used by planemakers.

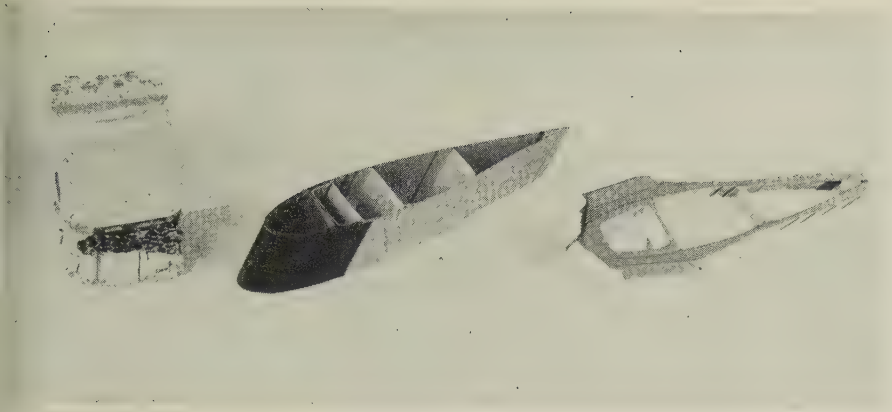
Others Users — The appliance, furniture, electrical, insulation, heating and air conditioning, building, and railroad industries also use adhesives.

They're Versatile—Most adhesives are made for a specific usage. But slight changes in composition, application, or curing procedure adapt them for other purposes, says Minnesota Mining. Reports B. B. Chemical Co., Cambridge, Mass.: "A fast growing use is bonding linings to tanks for holding corrosive materials."

Minnesota Mining adds: "Aluminum and magnesium can be joined more strongly by adhesives than by any other method."

They're Strong—Eastman Kodak Co. claims one drop of its new liquid adhesive, bonding the ends of two 2-in. steel rods, will lift 5000 lb after 30 minutes curing time.

Advantages—Adhesives can:



Among the fastest-growing metalworking applications for adhesives are honeycomb structures (left) and helicopter blades (two cross sections at center and right). Above samples courtesy of B. F. Goodrich Industrial Products Co.

- Join dissimilar metals.
- Eliminate high temperature needed to weld or solder.
- Fasten thin metal sheets.
- Act as a sealer.
- Damp vibration.
- Provide a heat or electricity insulating layer.
- Uniformly distribute load.
- Allow smooth surface contours.
- Cut down on specialized labor.
- Reduce weight.
- Usually increase service life.
- Permit fast assembly.
- Give great strength.
- Allow automatic assembly (parts can be sprayed with adhesive at one point in assembly line and joined at another).
- Protect against corrosion.
- Allow more intricate design.
- Permit use of lightweight metals because greater area of bond increases rigidity.
- Eliminate protrusions: Improve aerodynamics, enhance appearance, aid styling, eliminate gaps and bulges.
- Maintain soundness of structural members: No holes or countersinking.
- Aid production flexibility.

Limitations—On the other side of the ledger:

- Investment in jigs, fixtures, ovens, autoclaves, or presses is often necessary.
- Stability at elevated temperatures is limited.
- Long drying times are often required.
- Peel strength is often low, while sheer, tensile, and creep strengths are often high.
- They are flammable.
- Products sometimes require redesign.
- Bonds usually can't withstand extreme shock.

Cost—The price per pound in 1000-lb lots varies from about 14 cents for some elastomeric reclaim rubber compounds and thermosetting urea formaldehydes to over $5 for some epoxies and resin blends.

Price per gallon varies from 50 cents to over $30, reports Permacel Tape Corp., New Brunswick, N. J. Tapes cost $1 to $2 per square foot, says Shell Chemical Co., New York.

Application — Epoxies are nonvolatile liquids and are applied with a knife, brush, or notched trowel. Modified vinyl phenolics and phenolic elastomers are applied as films or solutions.

Many Varieties—There are over 25 basic types of adhesives in commercial use, each of which can be modified to serve numerous purposes.

Armstrong Cork Co., Lancaster, Pa., sums it up: "No 'general purpose' adhesive exists." But by varying the selection of thermosetting and thermoplastic resins, elastomers, and fillers, properties can be greatly modified—including flexibility, temperature resistance, exposure resistance, shear strength, dead load strength, and peel strength.

Mag: 2000 A.D.

By then use will amount to several million tons yearly, association is told by researcher

BY 2000, production and consumption of magnesium will be at the annual rate of several million tons, delegates at the Magnesium Association convention in New York were told.

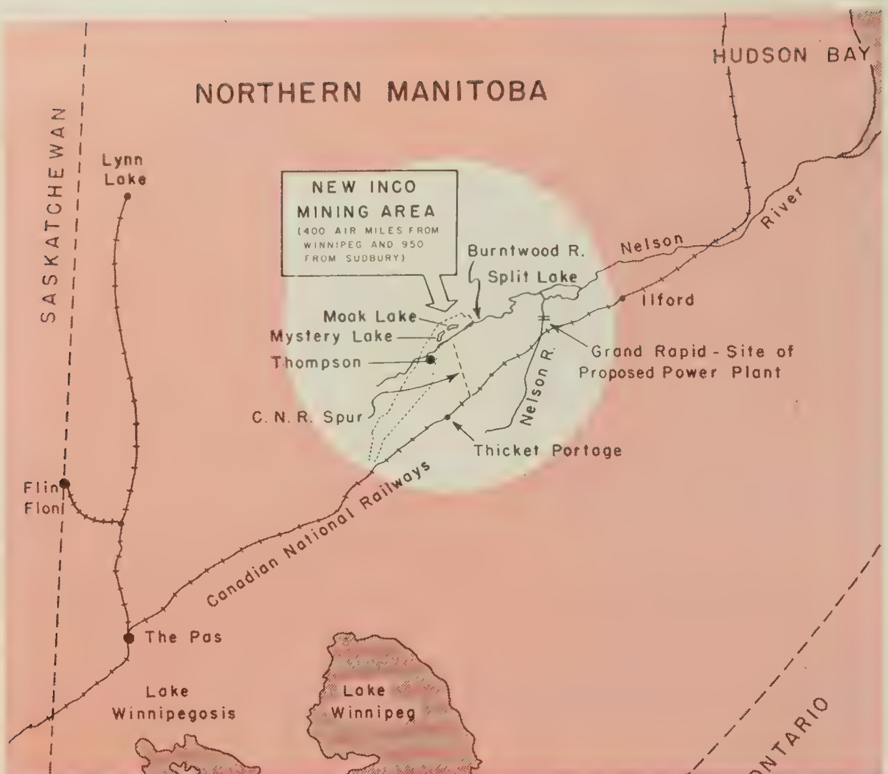
Dr. R. M. Brick, director of research-metallurgy for Continental Can Co. Inc., New York, added that no foreseeable demand could seriously dent availability of the metal. "If it were to be produced for 100 years at the current rate of steel production, the ocean content (of magnesium) would only drop from 0.13 to 0.12 per cent."

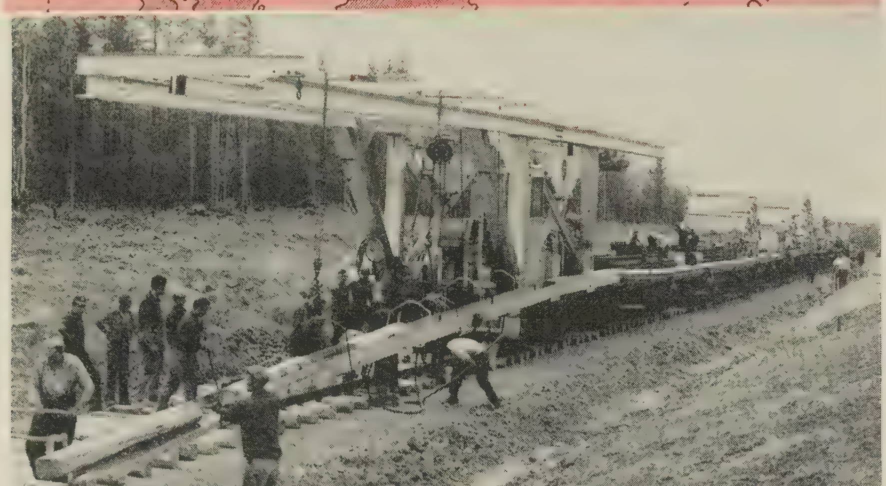
A Prospect—The can represents a potential for magnesium, Dr. Brick believes. Here's why: "Aluminum is expected to make strong inroads into this industry traditionally dominated by tin plate. But look for 3 per cent magnesium to be added to aluminum to make can production more economical. It could mean as much as 30,000 tons of magnesium would go to the can industry yearly (if the prediction of an annual consumption of 1 million tons of aluminum by the can industry holds up)."

Dr. Brick said more and more magnesium will be used where: 1. Lightness is most important. 2. Fabrication cost is more important than the base cost of the metal. 3. High strength-to-weight ratio is necessary.

Requirements—Several speakers warned that the metal's future will depend on how good a job of development and selling the industry does. Said John H. Rizley, Convair Div. (San Diego, Calif.) of General Dynamics Corp.: "Due to its lightness, magnesium will be in demand in future aircraft and missile structural design so long as the development of new alloys keeps pace with competitive metals. At present, magnesium alloys hold a slight advantage on a strength-to-weight and stiffness-to-weight ratio basis."

Said A. G. Cole, Magnesium Elektron Ltd., London, England: "What is required is a more complete documentation of magnesium uses."





30-mile railroad spur opens up nickel deposits in Manitoba

Inco Expands in Canada

COMPLETION of a 30-mile railway through rugged terrain in northern Manitoba has opened the way for shipments of nickel from what will become the world's second largest producing facility.

The $5-million track links International Nickel Co. of Canada Ltd.'s extensive ore holdings in the Mystery-Moak Lakes region with the main Hudson Bay line of the Canadian National Railways.

Inco is sinking shafts for two mines (Thompson and Moak) 400 air miles north of Winnipeg. Ore from the Moak mine will be transported to Thompson over a 22-mile railroad spur. Although three times as much ore will eventually come from Moak, emphasis at first is on Thompson because its ore is richer.

Integrated—When completed in 1960, the facility will be fully integrated. Under construction at Thompson are a milling plant, smelter and refiner. Production of refined nickel will be at a rate of 30,000 tons annually by June, 1960; 37,500 tons by the end of that year.

Spokesmen hint that ore production will continue well past 2000. Preliminary drilling indicates some deposits go down 3000 ft. Another factor: Nickel content of the Mystery-Moak Lakes ores reportedly runs 1 to 4 per cent higher than it does at Inco's largest mine at Sudbury, Ont.

Other deposits may be found in the Manitoba area. Inco's holdings include some 300,000 acres (the Mystery-Moak development is 80 miles long and up to 10 miles wide).

Cost—Inco will spend $115 million to develop the facility before the first pound of ore is removed.

A town of about 8000 will spring up on the Burntwood River, a few miles from the Thompson mine, to house the influx of 2000 workers and their families.

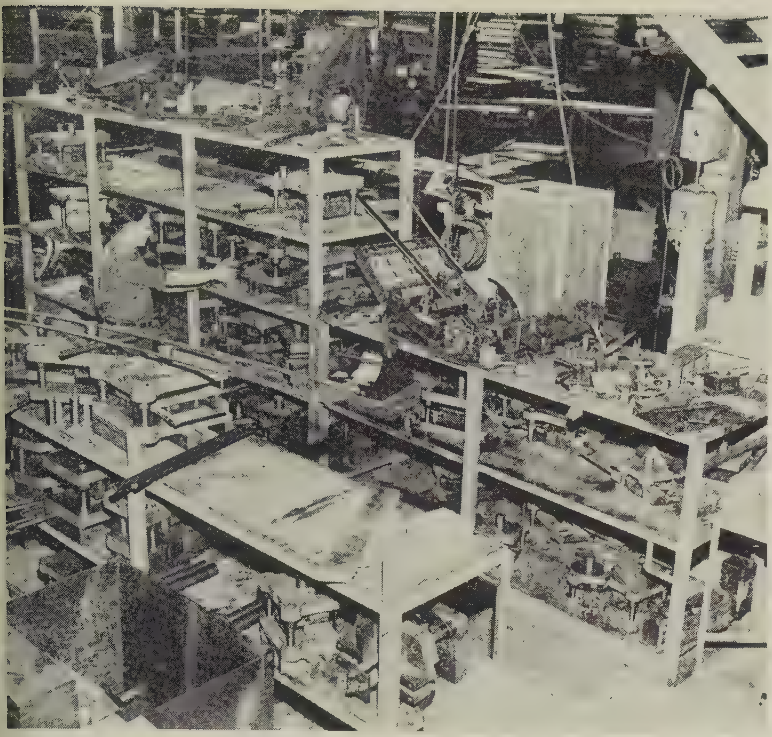
Troubles?—The new mines will push Inco's production capacity to 192,500 tons annually by 1960, about 50,000 tons more than it had in 1956. Free World nickel production by the end of 1960 should reach 317,500 tons, compared with around 214,000 tons in 1956. But demand is off this year, and indications are that 1958 won't be much better.

Earlier this year, Inco asked the Office of Defense Mobilization to take some of this new production for stockpile. The government refused. In a more recent development, ODM informed all producers that it did not want to take any nickel for stockpile in 1958 (STEEL, Oct. 14, p. 204).

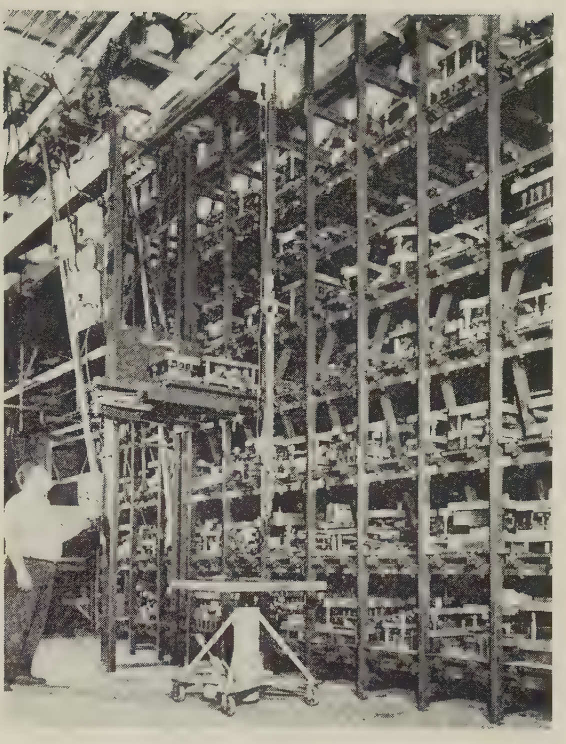
It means nickel producers will have to step up development of civilian markets.

Gets Air Force Contract

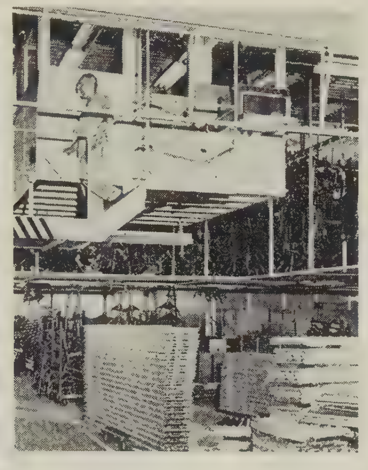
Lockheed Aircraft Corp., Burbank, Calif., will seek ways to put metalforming with high explosives into production use for the Air Materiel Command, Wright-Patterson Air Force Base, Dayton, Ohio. The method has been hailed as the answer to practical handling of extratough metals.



Before: Dies were stored on steel benches only 4 ft high, covering 375 sq ft. They had to be lifted, slid, or carried



After: New racks use only 170 sq ft, and dies are easily accessible by overhead transfer or hoist



Point-of-Use Storage: Example is Flow Rack accumulator (left). Tote boxes are pushed into rack from lift truck and pulled out on other side at assembly line. Overhead offices save space (right)

RESULTS:

1. **Practically eliminates overtime.**
2. **30% greater efficiency.**
3. **50% more production capacity.**
4. **Saved $200,000 vs. cost of plant addition.**
5. **Saved $400,000 on inventory in one year.**
6. **Quicker turnover of materials.**
7. **Faster shipping.**
8. **Simpler accounting.**
9. **Plant works as lab and showcase.**

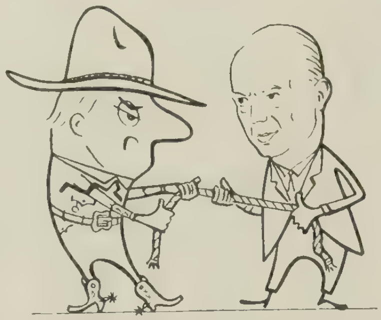
Technics Takes Over

IN AN AGE of shrinking profits, the art of co-ordinating material handling (termed technics) allows small companies to increase productivity without expensive plant additions.

It permitted Rapids-Standard Co. Inc., Grand Rapids, Mich., to increase profits while holding price raises below the industry average, says James R. Sebastian, R-S president. The firm is among the top ten material handling equipment makers. Says Mr. Sebastian: "We simply decided to use our own products to best advantage."

How It Works — Movement, transfer, accumulation, and control are the key areas of efficient material handling. By redesigning storage to take less space and be at point-of-use, R-S licked the first problem. Automatic conveyors, Flow Racks, easy access roll-out shelves, and relocated aisles solved the second problem. IBM cards helped accounting and control.

Example—In the small parts welding department, tools are hung on an overhead conveyor which circles the area. When a worker needs a jig or fixture, he pushes a button; the conveyor circles until he can select the item he wants. Result: 2000 sq ft of floor space saved. Photos show other examples.



New Tug of War: Ike and Congress

THE ADMINISTRATION is gathering its forces for an all-out push in 1958 to keep foreign trade high. While foreign trade of the U. S. stands at a record annual rate of over $30 billion, President Eisenhower doesn't want anything to slow its continued growth. Two matters which could affect it come up next year in Congress: 1. Renewal of the Reciprocal Trade Agreements Act. 2. Appropriations for foreign aid.

Henry Kearns, assistant secretary of commerce for international affairs, estimates over 4 million American families gain their income almost entirely from foreign trade. He thinks exports will hit the $20-billion mark this year, compared with $17.3 billion last year. Imports amounted to $12.7 billion in 1956. Those figures do not include military programs.

Here's where foreign nations get U. S. dollars to buy U. S. exports (1956 figures): 1. U. S. imports worth $12.7 billion. 2. Tourist spending of $4 billion. 3. Industrial investments of $2.7 billion. 4. Military spending of $3 billion. 5. Government loans of $2 billion.

Foreign Trade: A Two-Way Street

Any slowdown in exporting that money will work a hardship on our export business, say Ike's top advisers. Vice President Nixon is calling for a five-year extension of the Reciprocal Trade Agreements Act, which, since 1934, has reduced import tariffs as much as 75 per cent on some goods.

Under GATT, the General Agreement on Tariffs & Trade with 37 nations, escape clauses permit a country to raise import duties or limit imports when the domestic industry is threatened. The administration wants Congress to O.K. our participation in OTC, the Organization for Trade Co-operation, an outgrowth of GATT, which will "provide a forum to discuss international trade policy," Mr. Kearns notes. Congress turned it down last session because of its internationalism flavor, but Ike is hoping to push it through next year as the only means through which the U. S. can continue to promote trade to the extent that it has in the last few years. Without OTC, Mr. Kearns hints GATT will break down.

But Congress Wants To Keep Control

The leading Congressional point of view: Agreements like GATT could be handled as well by foreign trade committees and subcommittees.

Although not necessarily representing the majority of Congress, the watchdog on Capitol Hill is Rep. Hale Boggs (D., La.), who heads the Foreign Trade Policy Subcommittee of the House Ways & Means Committee. Available now to interested parties: An 1157-page compendium of views on foreign trade prepared by the subcommittee's staff. From Dec. 2 to 14, the subcommittee will hear witnesses in Washington who wish to add to or disagree with the views expressed in the compendium. "Early in the next session," says Representative Boggs, "the subcommittee will issue recommendations for legislation."

The Outlook

Foreign aid will have rough going next session. Congress cut $600 million out of Ike's request for $3 billion last session. With the Defense Department expected to ask for $40 billion in new money for fiscal 1959 (and Congress probably willing to give it more than that), foreign aid will be the easiest place to economize. (Aid cuts don't hurt too many constituents.) Look for the Trade Agreements Act to be extended—but for only three years.

National Security Clause Will Stay

Some industries, via recognition of their national security status by the Office of Defense Mobilization, have been able to get around what they describe as "ruinous" foreign competition. Look for a thorough study of these cases, with the nonferrous metals getting some special attention from the Ways & Means Committee. Representative Boggs was the most vocal member of the committee last session in refusing tariff help for the lead and zinc industries. He cited ODM's failure to help through the national security ruling as indicative of the lack of need for any aid. Chances are that his subcommittee will favor restricting ODM's power in this area, but Congress as a whole will probably stand back of the ODM.

With copper and lead both banging at the Tariff Commission's doors, you can reasonably expect mineral state congressmen to fight hard next session over our foreign trade policy, but no one thinks we are turning back to the old protectionist days.

Meet Russell H. Hughes: He's assistant director for production, Office of Defense Mobilization. Like recently appointed Defense Mobilizer Gordon Gray, Mr. Hughes is an ex-Pentagonian. At the Defense Department, he was assistant director for production policy in the office of the assistant secretary of defense for supply and logistics. Mr. Hughes retired from New York Telephone Co. as a vice president in 1955.

Here's another plea for tax depreciation reform to . . .

Make Paper Profits Real

BY 1960, the U. S. steel industry will have to use $600 million from "profits" to replace plant and equipment, says Rev. William T. Hogan, director of industrial economic research at Fordham.

In 1956, industry's depreciation charges amounted to $743 million. Yet about $400 million had to be taken from "paper profits" to replace plant and equipment because tax laws base depreciation on original, not replacement, costs.

Increase Explained—The prediction for 1960 assumes: 1. Inflation will continue. 2. The steel industry is growing, so replacement will grow. 3. Depreciation accruals will remain almost constant. Large portions of present accruals come from rapid amortization. By 1960, these funds will be practically depleted, offsetting the increase in normal depreciation funds.

The Problem — At its present rate of profit, it would take the steel industry 13 years to replace its assets, adjusted to current prices, if every cent were plowed back into the business.

The construction dollar has fallen to less than 40 per cent of its 1940 value. Equipment installed for $1 million in 1940 costs about $2.5 million to replace today. Depreciation set-asides on it come to only $1 million. Replacement takes an additional $1.5 million out of declared profit—on which income taxes have been paid.

Examples — Reverend Hogan cited several cases in addressing a Pittsburgh meeting of the Association of Iron & Steel Engineers.

One firm, in replacing its worn-out facility between 1946 and 1955, had to supplement each dollar of depreciation accrual with $1.30 taken from earnings.

Added Difficulty—It might be argued that new equipment should be termed expansion instead of replacement, which would partially justify taking the cost out of profits. But Reverned Hogan says: "The industry must raise substantial funds in addition to its depreciation accrual just to keep its present plant operating."

Adequate depreciation in 1955 or 1956 would have reduced net profits to $800 million plus (versus declared profits of about $1.06 billion). Although the hypothetical figure still amounts to a record dollarwise, it is illusory because of inflation. For example, in 1916, the industry had net profits of $608 million, or around $1.5 billion in terms of 1956 dollars. Ingot production was 47 million tons in 1916, vs. 115 million tons in 1956.

Three Solutions—The basis of any solution must lie in some type of tax reform. Industry must recover the original cost of investment, not in dollars, but in purchasing power. The solution must be based on a flexible norm because: 1. The life span of a piece of equipment cannot be accurately predicted. 2. The valuation changes because of obsolescence and fluctuations in price level. Reverend Hogan mentions three solutions.

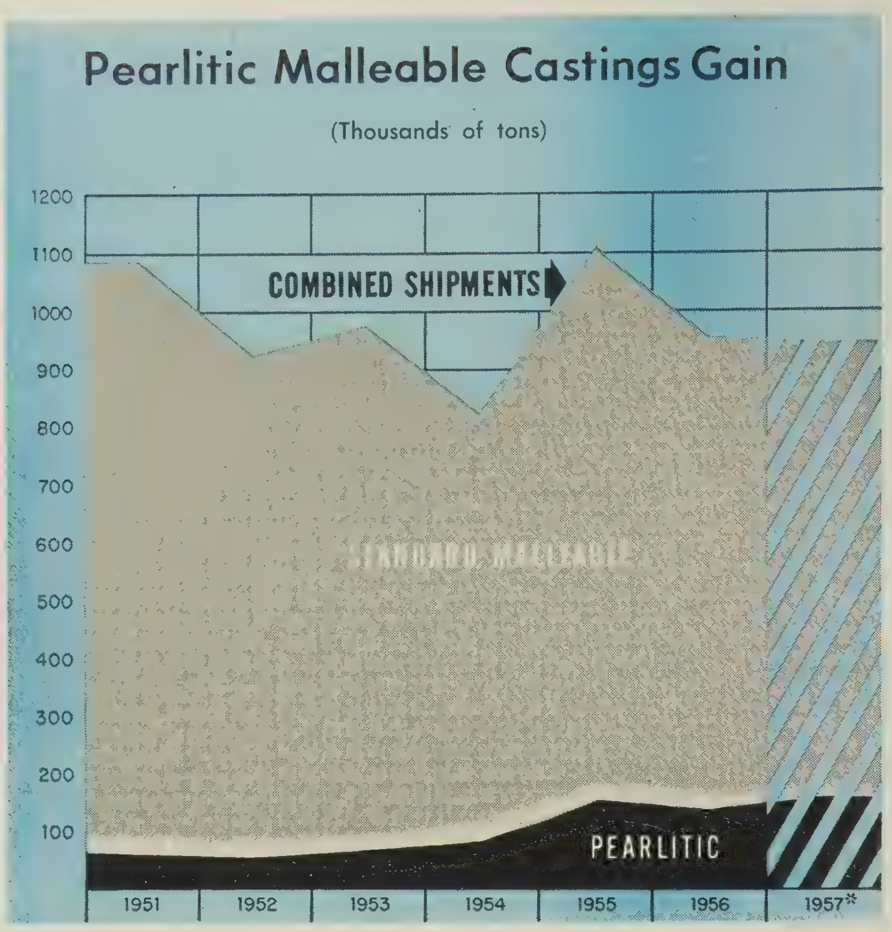
One—Total plant revaluation: Revaluate the total plant annually at a constant percentage of the depreciation charge. Example: A company valued at $1 million in 1957 takes 5 per cent depreciation, or $50,000. If the purchasing power of the dollar declines 2 per cent in 1958, the firm is revalued at $1.02 million and the company takes 5 per cent again. Depreciation this time is $51,000. On the same basis, 1959 depreciation would be $52,020.

Two—Individual asset revaluation: Depreciation is charged on each asset. It requires: 1. An index of inflation. 2. Determination of the life span of each piece of equipment. 3. Adjustment of the value of the equipment and the depreciation charge against it each year after the end of the first.

Example: Say an asset with an original value of $100 has a life span of five years. Add 10 per cent to the original value each year for inflation. Adjustments are made this way:

Inflation	Previous Allowance	Adjusted Value	Current Charge
$100	....	....	....
110	....	$110.00	$22.00
120	$22.00	98.00	24.50
130	46.50	83.50	27.83
140	74.33	65.67	32.84
150	107.17	42.83	42.83
			$150.00

Three—Lumping: Charge off, in the year in which equipment is replaced, the difference between the original cost of the asset and the actual replacement cost. The difference would be established by an index. It would not mean that an identical asset need be bought, but the purchasing power of the dollars originally paid for the item would be reclaimed.



Source: Bureau of the Census and Malleable Founders' Society.
*Estimated by STEEL.

Malleable Trends

- Development of new and improved grades of pearlitic malleable iron.
- Aggressive sales programs aimed at conversion of forgings, stampings, and weldments to castings.
- Conversion of standard malleable castings to pearlitic malleable in applications where greater strength is required.

Malleable Summary

Sales: Down 12 per cent.

Prices: Up 8 per cent.

Backlogs: "Nil" to two months.

Workload: 75 per cent of capacity.

Hours: 32 to 40 per week.

1958: About the same as 1957.

Main market: Automotive.

Standard Castings Decline

GIVEN a modest upturn in fourth quarter business, malleable iron founders could match their 1956 shipments of castings (951,868 tons). But they'll have to settle for less if buyers persist in hand-to-mouth ordering.

Despite an 8 per cent increase in production by the automotive industry, biggest foundry customer, shipments of malleable castings are 12 per cent behind last year's pace. Lowell D. Ryan, executive vice president of the Malleable Founders' Society, Cleveland, is scaling down his 1-million-ton forecast of last December. He expects 1957 shipments to hit 925,000 tons. "My first estimate was based on the assumption that we'd turn out 6.5 million cars," he explains.

Nonautomotive Sales Off—Although sales to auto and truck manufacturers have been satisfactory thus far, shipments to other markets are down about 15 per cent. There have been fewer orders from producers of agricultural machinery and tractors—customers who normally buy 7 per cent of the standard malleable castings. Makers of valves and fittings, distressed by construction cutbacks, are working off their inventories. Manufacturers of railroad freight cars are selling fewer cars and buying fewer castings. It's the same story for the road machinery industry, a group which takes 5 per cent of standard casting output.

A spotcheck of representative foundries indicates that business conditions vary from "same or slightly better than" to "12 or 15 per cent below" last year's sales. As a spokesman for a major midwestern foundry points out: "It just depends on who your customers are. If you're selling to Chrysler, you're probably well ahead of last year." If you sell to Ford, you may be out of luck. It's reported that the second biggest automaker has switched some castings from malleable, previously bought outside, to nodular iron, which it makes in its own shop.

Backlogs Down — Foundrymen say backlogs are lower than they were a year ago and leadtimes are "shorter than ever." While a few companies report two months' business on the books, as many say backlogs are "almost nil." Consensus: Buyers are working off inventories, ordering on a hand-to-mouth basis.

Says the owner of an Ohio foundry with diversified markets: "We're operating at better than 90 per cent of capacity, largely because sales to one big customer in automotive accessories are four or five times what they were a year ago." Less fortunate is the man who channels three-quarters

of his production to railroad freight car builders. He's operating at 65 per cent of capacity, and profits are down 10 per cent. If this year is below average in terms of profits, Mr. Ryan explains that "there are just too many companies running at 60 to 70 per cent of capacity."

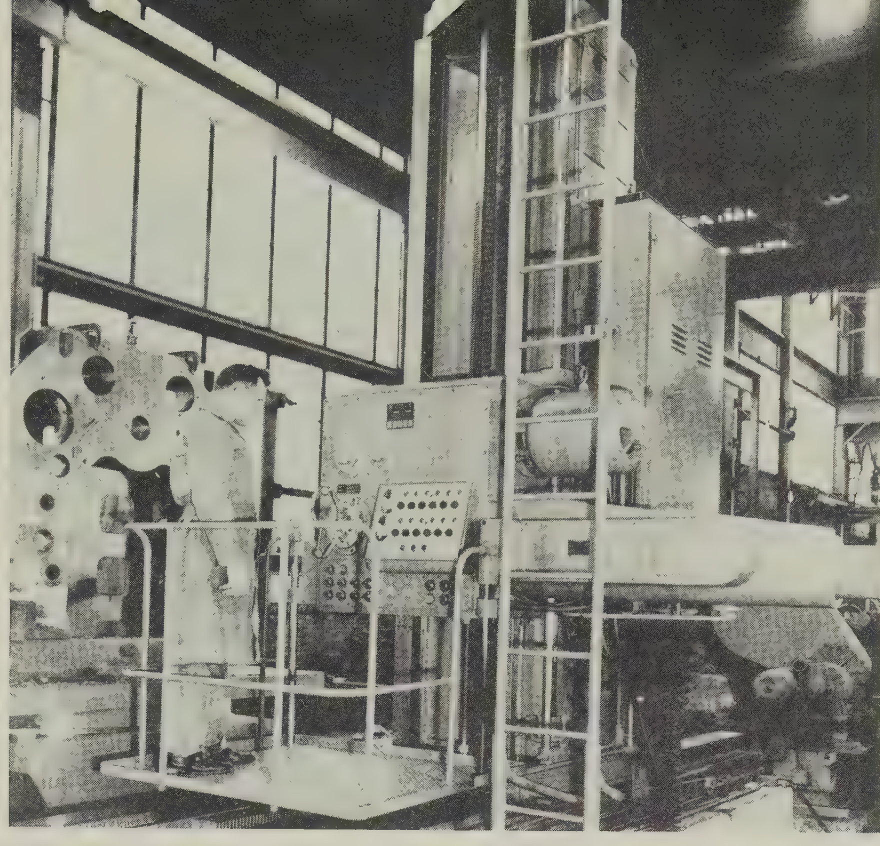
Costs Up — Although scrap prices are about $12 a ton lower than they were a year ago, the fluctuations since last October "complicated the business" of at least one foundryman, doing him more harm than good. No sooner had he reduced prices, he complains, than scrap went rocketing again, catching him with his profits down. The inflationary trend in the cost of other materials and in labor has been unabated.

As the malleable founders' costs have increased, so have their prices. Today's quotations are 5 to 10 per cent higher than they were a year ago.

Ace Card — In pearlitic malleable, a material noted for its high strength and hardness, foundrymen believe they have one answer to the problem of shrinking markets. Since 1951, members of the Malleable Founders' Society have increased pearlitic's share of total malleable shipments from 7 to 17.5 per cent. They've had conspicuous success in sales to the automotive industry, despite strong competition from forgings and nodular iron.

"There's plenty of room for expansion in sales of regular castings, too," says George T. Boli, president, Northern Malleable Iron Co., St. Paul. Urging foundrymen to sell more aggressively, he charges that "the trouble with many of the foundries is that their owners will invest $100,000 in new equipment but won't spend $50,000 on sales efforts." Last year, four of Mr. Boli's salesmen brought in 386 new jobs—conversions from weldments, stampings, forgings, and steel castings.

Outlook for 1958—Asked to comment on next year's sales prospects, one foundry operator replied: "I think we're all inclined to change our minds too abruptly. I have no reason to expect that next year will be much different from this one." There's a great deal of support for that view.



New binary code tape control system offers more . . .

Automation for Small Shop

SMALL machine shops can look forward to more automation. Tool builders are designing equipment to hurdle the cost obstacle.

Example: A new binary code tape control system for floor type horizontal boring, drilling, and milling machines by Kaukauna Machine & Foundry Div. (Kaukauna, Wis.) of Giddings & Lewis Machine Tool Co. Cost of the electronic system: $30,000 and up.

Cuts Steps—The control system is designed to eliminate layout work, scale and vernier reading, template making, and jig and fixture making. Kaukauna equipment uses three positioning methods for versatility: 1. Standard electric manual control. 2. Digital dial control. 3. Binary code tape control.

In digital control, the operator dials head and column dimensions taken directly from the blueprint. Pressing a "read-in" button transfers the dialed dimensions to visual light numbers for checking. He then presses the automatic traverse button and the machine positions itself.

On the Run—While machining in this location, the operator can dial the next operation and make his visual check. When machining is complete, pressing the traverse button will take the machine to the next position automatically. Electronic verniers indicate to 0.0001 in. the accuracy of the machine's positioning.

It is necessary in dial or tape control to adjust the measuring system of the machine to the location of the workpiece on the floor plate or table being used. It is done through automatic zero offset controls, after placing the spindle at a zero point.

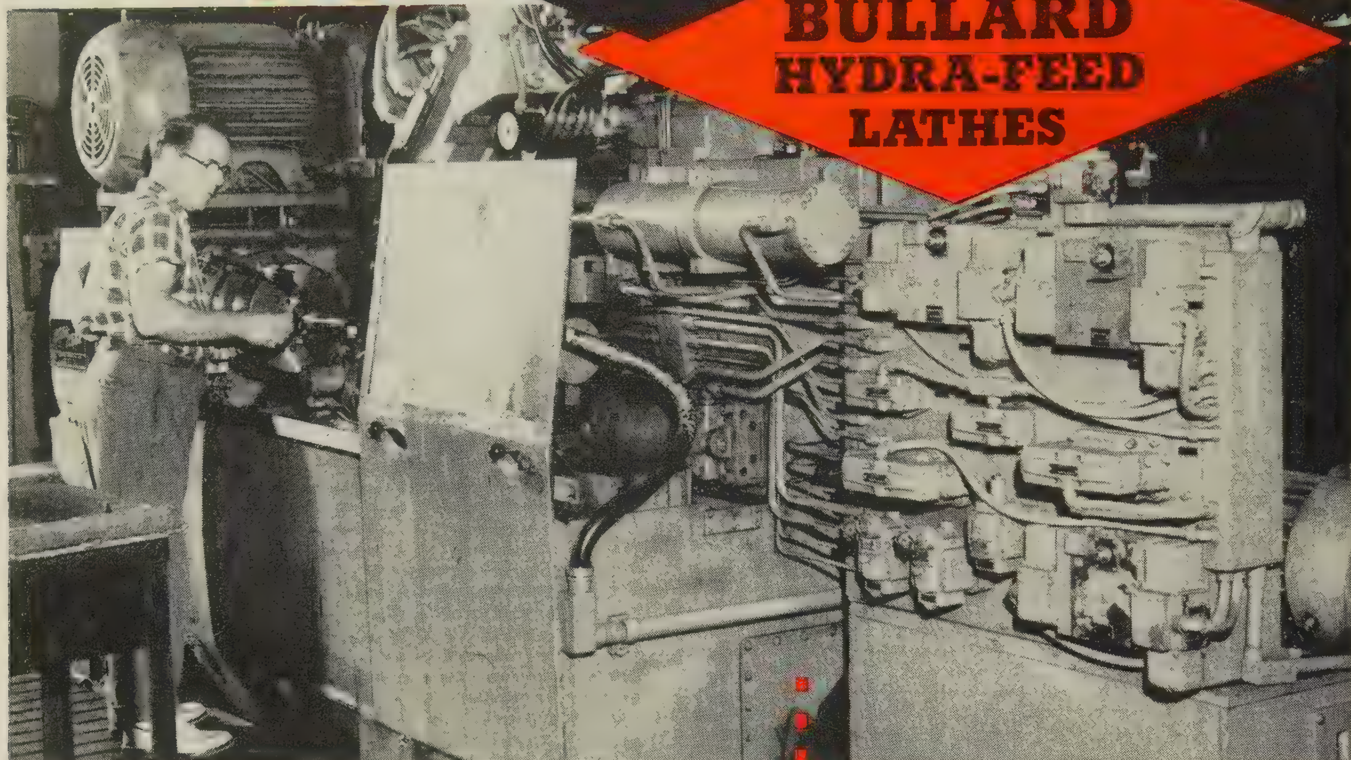
Set Up on Typewriter—The punched paper tape is prepared on standard tape producing typewriters. From a standard engineering drawing, a manuscript or operation sheet is prepared, outlining the exact steps desired.

saves 75% on changeover time with . . .

simplified set-up

on

BULLARD HYDRA-FEED LATHES



Illustrated below is one of more than forty different pinions processed on the same Bullard Hydra-Feed Lathes.

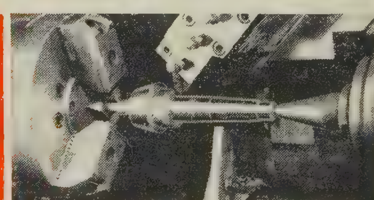
"Unless the consecutive set-ups from one job to another were similar," reports the Foreman of a large midwestern automotive parts manufacturer, "changeover set-ups took from ten to sixteen hours. But now, with Bullard Hydra-Feed Lathes, and going from one extreme to the other, the changeover is accomplished in less than four hours."

Additional reasons for their enthusiastic acceptance of Bullard Hydra-Feed Lathes include less spoilage, greater accuracy, better finishes and reduced machining time over previous method.

These advantages can be applied to your machining requirements. Call your nearest Bullard Sales Office for full particulars or write

FIRST CHUCKING

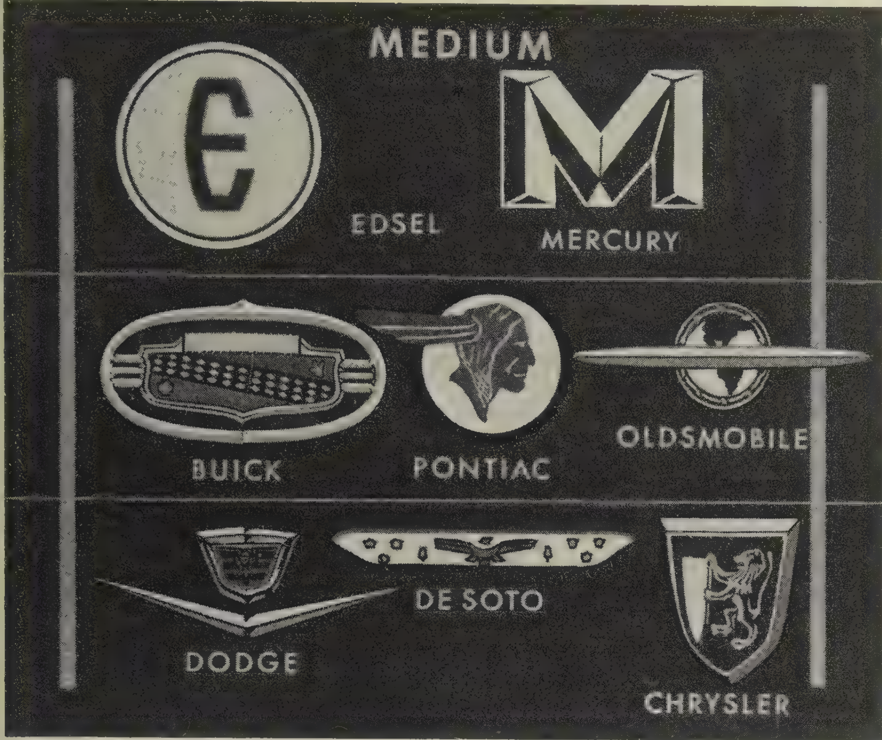
SECOND CHUCKING



FINISHED PIECE

THE BULLARD COMPANY
BRIDGEPORT 9, CONNECTICUT

Remember—to cut costs when cutting metal—buy BULLARD



Medium Price Market Hit

Car buyers turn away from the middle priced class of autos. Builders will try to recapture sales in that range with more lines and accessories, but they'll find opposition strong

WITH SALES of medium priced cars down 11.7 per cent from last year's, this segment of the industry is in for a tough fight to boost its share of the market in 1958.

Medium priced cars are taking 31.14 per cent of the market, says *Automotive News*. That's 4.1 points below last year's figure.

The trend has gone like this in recent years: Buyers first shifted from medium priced cars into the more expensive low priced series. The heaviest buying this year is in the center of low priced groups. Economy models (including foreign jobs) seem to be in for a bigger share of sales.

What's Medium?—Traditionally, the industry follows the four price group classifications established by R. L. Polk Co., Detroit.

Low priced cars include Ford, Plymouth, Chevy, Dodge, and Rambler 6-cylinder models, Studebaker Champions and Commander V-8s. Imported economy cars are also in this class.

Polk's low medium and upper medium brackets exclude Buick Limiteds and Roadmasters, Chryler New Yorkers, and Packards. They are added to the high price group (Lincoln, Cadillac, Imperial, and Continental). Sports cars generally fall into the upper medium grouping.

To Each His Own—Although sales figures indicate a market drop, Polk registrations for the first eight months of the year show that medium priced cars are taking 37.4 per cent of the market, some 3.2 per cent more than they did in 1956.

Registrations are not sales, however, and it's expected revisions will show the usual market drop.

Divisions Differ—Other interpretations of the medium price market run like this:

S. E. Knudsen, Pontiac's general manager, claims sales of this group are down about 14.31 per cent from last year's.

Jack Wolfram, Oldsmobile's general manager, says sales of medium priced vehicles are off "just slightly." He adds that for 11 years (through 1956) the medium price market annually has accounted for an average of 32 per cent of total sales.

Results Same—But no matter how you figure, medium priced cars are in a squeeze play. Buyers apparently would just as soon purchase a lower priced car loaded with accessories as a medium priced car having the bare necessities.

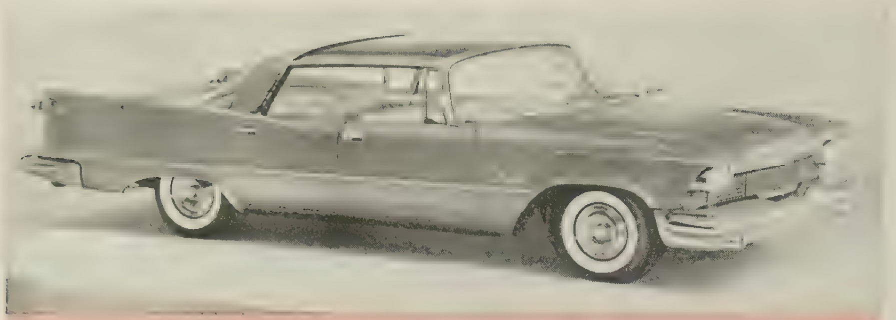
The industry is well aware of another factor: When business is cautious, buyers are in no mood to move into a higher priced car bracket—if they buy at all.

Right now, predictions for 1958 are on the conservative side. The industry may find that many who bought cars on credit in 1955 won't return to the market as expected.

Strategy—To woo more sales away from the low and high price fields, Ford has introduced Edsel with a price spread of $2519 to $3801 (factory list). Mercury has upgraded its line by adding the luxury Park Lane series. Pontiac is after the sports car lovers with its Bonneville series. American Motors has lowered prices on its Rambler Ambassador in an effort to increase its share of the market.

It sounds like medium priced cars are in for a sales upturn, but plenty of opposition is being readied in the low price circuit.

Opposition — Ford's Fairlane still is considered in the low price group although with all accessories it costs as much as an Oldsmobile 88 or a Dodge. Until price



Chrysler Introduces Imperial

ENGINE

Type: V-8	Carburetor: Four barrels
Displacement: 392 cu in.	Torque: 450/2800 rpm
Compression ratio: 10:1	Horsepower: 345/4600 rpm

DIMENSIONS

Wheelbase: 129 in.	Width: 81.2 in.
Length: 225.8 in.	Tires: 9.50 x 14
Height: 57 in.	*Axle ratio: 2.93:1

*With TorqueFlite; 3.15:1 with air conditioning.

GM Introduces Oldsmobile's Dynamic 88

ENGINE

Type: V-8	Carburetor: Two-barrel Econ-o-way
Displacement: 371 cu in.	Torque: 390/2400 rpm
Compression ratio: 10:1	Horsepower: 265/4400 rpm

DIMENSIONS

Wheelbase: 122.5 in.	Width: 78.5 in.
Length: 208.2 in.	Tires: 8.50 x 14
Height: 56.97 in.	*Axle ratio: 3.08:1

*With Hydra-Matic; Synchromesh is 3.64:1.

groups are re-evaluated, the Fairlane and Chevy's Impala series will be knocking on the medium price class door.

In addition, lower priced cars are offering more accessories and options than ever before in an effort to attract prospects. And the imported economy models are expected to take a larger share of the '58 market (see STEEL, Oct. 14, p. 80).

Outlook—It will be particularly interesting to watch how the sales battle shapes up between Mercury and its family rival, Edsel. Some industry seers are saying they won't be surprised if Mercury is upgraded right out of the picture in a few years if Edsel catches on.

In 1958, medium priced cars will do well to hold their own.

Exhaust Notes

- Many of the Buick series will be using twice as much aluminum on 1958 models, reports Edward T. Ragsdale, division general manager. Some of the luxury series will carry up to 95 lb of aluminum, compared with 50 lb in 1957. One of the 74 aluminum items for Buick is its 26-lb Flight Pitch Dynaflow transmission case.
- Harlow Curtice, GM's president, says Vauxhall Motors, Luton, England, will produce 160,000 cars this year. More than 50 per cent of them will be sold in export markets. Next year, Vauxhall Victor will be marketed through Pontiac Div. dealers; projected schedules call for imports of about 1000 a month.
- White Motor Co., Cleveland, says there's an industry-wide sales slump of about 15 per cent in heavy duty trucks this year. As a result, the firm is cutting back its No. 1 line to 28 trucks daily from previous scheduling of 36 units.

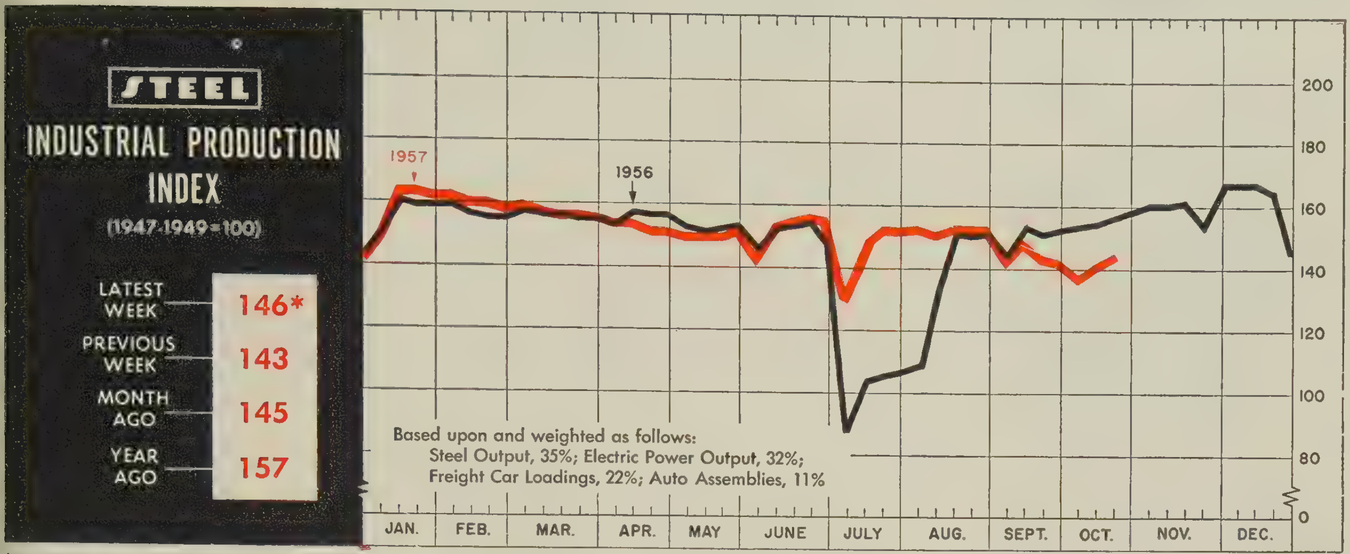
U. S. Auto Output

Passenger Only

	1957	1956
January	642,089	612,078
February	571,098	555,596
March	578,826	575,260
April	549,239	547,619
May	531,365	471,675
June	500,271	430,373
July	495,629	448,876
August	524,354	402,575
September	274,265	190,716
9 Mo. Total	4,677,136	4,234,768
October	......	389,061
November	......	581,803
December	......	597,226
Total	......	5,802,808

Week Ended	1957	1956
Sept. 21	52,365	35,652
Sept. 28	51,552	43,369
Oct. 5	21,975	59,367
Oct. 12	38,626	70,175
Oct. 17	71,375†	88,557
Oct. 24	95,000*	104,269

Source: *Ward's Automotive Reports*.
†Preliminary. *Estimated by STEEL.



*Week ended Oct. 19.

Failures Rise as Business Community Grows

MORE BUSINESSES are headed for failure in 1957 than in any year since 1939, but don't let the bare fact throw you. For every firm that throws in the towel, ten new ones will enter the business arena.

Numbers Misleading—The rising mortality among all businesses has gained a lot of attention in the last year, but little effort has been made to put the figures in their proper place. The fact is that the rate of fatalities has not kept up with the growth of the business population. Since 1940, the business community has grown from 3,276,000 to something over 4.3 million. With such growth, it would seem logical to assume that failures would also be much higher. Yet this year's total will do little more than match the 13,619 figure for 1940 and will fall considerably short of the record 14,768 fatalities in 1939.

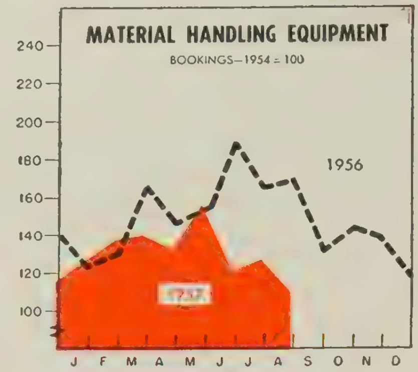
One of the big reasons for concern stems from comparisons. From 1943 through 1953 business was relatively secure. During the war, failures were almost unheard of. They began cropping up more often in 1947 and 1948, but the problem was not serious. Consumers were on a buying binge. Many persons with no particular business qualifications opened shops and found selling easy. But as the pent up desires became satisfied, marginal businesses started folding. The Korean War kept many from dropping out, but after that competition returned and weeded out more.

Basic Cause—With the gradual swing from the sellers' to the buyers' market, incompetence became a luxury few businessmen could afford. According to a Dun & Bradstreet study, this was the cause for 52.6 per cent of the manufacturing failures last year. Unbalanced experience and lack of competence all down the line resulted in inadequate sales, competitive weakness, receivable problems, and

BAROMETERS OF BUSINESS

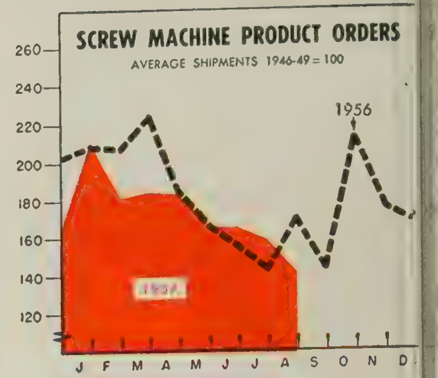
	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,045[1]	2,070	2,491
Electric Power Distributed (million kw-hr)	11,600[1]	11,709	11,333
Bituminous Coal Output (1000 tons)	9,915[1]	9,900	10,220
Petroleum Production (daily avg—1000 bbl)	6,750[1]	6,729	6,997
Construction Volume (*ENR*—millions)	$312.3	$323.9	$446.6
Auto, Truck Output, U. S., Canada (*Ward's*)	94,387[1]	59,847	117,930
TRADE			
Freight Car Loadings (1000 cars)	745[1]	742	829
Business Failures (Dun & Bradstreet)	244	261	259
Currency in Circulation (millions)[3]	$31,191	$31,129	$30,953
Dept. Store Sales (changes from year ago)[3]	−1%	0%	+5%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$21,835	$20,859	$20,761
Federal Gross Debt (billions)	$274.1	$274.1	$273.9
Bond Volume, NYSE (millions)	$24.1	$27.0	$15.2
Stocks Sales, NYSE (thousands of shares)	13,158	15,076	8,175
Loans and Investments (billions)[4]	$87.3	$87.9	$85.3
U. S. Govt. Obligations Held (billions)[4]	$25.3	$25.7	$25.7
PRICES			
STEEL's Finished Steel Price Index[5]	239.15	239.15	225.58
STEEL's Nonferrous Metal Price Index[6]	207.4	209.0	265.4
All Commodities[7]	117.6	117.6	115.2
Commodities Other Than Farm & Foods[7]	125.7	125.7	123.1

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1957, 2,559,490; 1956, 2,461,893. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.



	1957	1956	1955	1954
Jan. ..	126.34	122.43	97.00	93.56
Feb. ..	139.29	129.56	98.71	96.45
Mar. ..	140.76	166.14	149.16	115.55
Apr. ..	132.67	145.20	109.52	122.76
May ..	157.95	155.53	110.50	98.54
June ..	121.57	189.13	139.00	112.42
July ..	128.31	165.50	111.76	91.68
Aug. ..	110.09	168.70	106.20	94.06
Sept. ..	....	.130.35	136.80	88.43
Oct. ..	.....	143.38	123.52	95.41
Nov. ..	.....	138.50	118.09	88.66
Dec. ..	.....	117.76	139.85	102.49
Avg ..	.....	147.68	120.01	100.00

Material Handling Institute Inc.
Charts copyright, 1957, STEEL.



	New Orders		Shipments	
	1957	1956	1957	195[illegible]
Jan.	211	208	206	21[illegible]
Feb.	181	207	185	21[illegible]
Mar.	185	224	197	21[illegible]
Apr.	183	184	193	19[illegible]
May	167	165	192	17[illegible]
June	166	154	173	17[illegible]
July	159	142	139	13[illegible]
Aug.	143	170	177	17[illegible]
Sept.	...	143	...	16[illegible]
Oct.	...	213	...	20[illegible]
Nov.	...	175	...	18[illegible]
Dec.	...	167	...	16[illegible]
Avg	...	179	...	18[illegible]

National Screw Machine Products Ass[illegible]

other difficulties too hot to handle.

Age No Insurance — Almost a fifth of last year's failures can be traced to the lush period following World War II. The percentage of failures accounted for by businesses ten years or older has been rising steadily since 1947, while the fatalities among those five years old or less has held steady at about 58 per cent of the total. Size is no safeguard. Last year, 49 firms with liabilities of more than $1 million closed down. This year the number should be about the same (there were 25 during the first half of 1957).

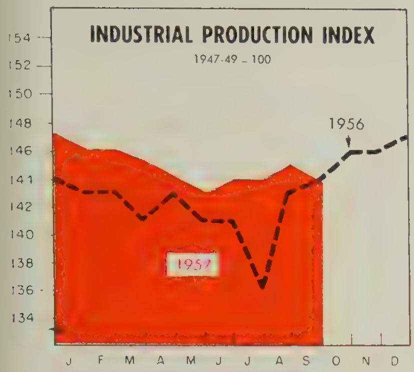
One of the hardest hit groups in the last two years has been the construction industry. According to Associated General Contractors of America Inc., Washington, the decline has been due in part "to increasing competition, the entrance of many new, inexperienced firms into the field, and the increasing hazards of doing business in today's economic atmosphere of rising costs and decreasing profits."

Growth Continues—The fact that incorporations outnumber failures ten to one assures the business community of a rise in population only slightly less spectacular than the 53,500 increase of last year. D&B reports that the September total of 10,526 was 9.8 per cent above the year-ago figure, bringing the nine-month total to 105,601. That's only 3091 under the corresponding level of 1956. It will be at least the third best year in history for new charters.

Index Continues Climb

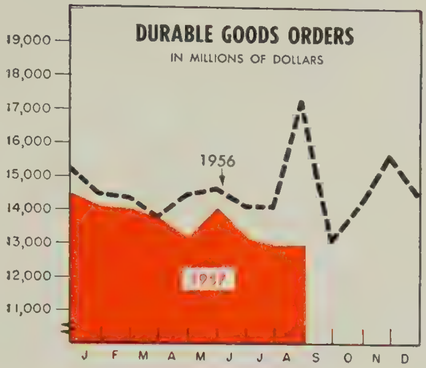
STEEL's industrial production index continues its climb back up on the strength of rising auto production. (See chart, Page 137.) All carmakers are turning out 1958 models and shooting for full production before the middle of November. Before the quarter has run its course, weekly production could be the highest since the auto boom of 1955. Autodom has scheduled fourth quarter output to match that of last year's period, but schedules will have to be beefed up to meet the goal. Production got off to a later start than it did for '57s. If the difference is to be made up, it probably will be in the last six weeks of this year.

Output of electric energy staged a comeback during the week ended Oct. 12, gaining from 11.564 billion kw-hr the previous week to 11.709 billion kw-hr. It is too early



(Seasonally Adjusted)	Total Production 1957	Total Production 1956	Primary Metals 1957	Primary Metals 1956	Metal Fabricating 1957	Metal Fabricating 1956
Jan.	146	143	144	148	180	170
Feb.	146	143	143	146	180	168
Mar.	145	141	137	145	179	167
Apr.	144	143	136	146	176	170
May	143	141	132	141	175	167
June	144	141	132	136	177	168
July	144	136	133	69	177	169
Aug.	145	143	136	125	177	172
Sept.	144*	144	134*	148	174*	174
Oct.	...	146	...	147	...	177
Nov.	...	146	...	147	...	180
Dec.	...	147	...	145	...	183
Avg	...	143	...	137	...	172

Federal Reserve Board. *Preliminary.



	New Orders* 1957	New Orders* 1956	Sales* 1957	Sales* 1956
Jan.	14,176	14,449	14,941	13,832
Feb.	14,102	14,374	14,808	13,824
Mar.	13,853	13,771	14,198	13,252
Apr.	13,234	14,468	14,254	13,723
May	14,115	14,654	14,296	13,570
June	13,249	14,093	14,207	13,587
July	13,005	14,087	14,573	13,021
Aug.	13,060†	17,342	14,184†	13,723
Sept.	.....	13,042	.....	13,449
Oct.	.....	14,312	.....	14,393
Nov.	.....	15,776	.....	14,249
Dec.	.....	14,543	.....	14,526

*Seasonally adjusted. †Preliminary.
U. S. Office of Business Economics.

to call it a trend, but the ultimate strength of this sector of the index should be clearly indicated within the next two weeks. Steel production remained near 81 per cent of capacity, and freight car loadings held at the 741,000 level.

Foundry Equipment Zooms

In August, the foundry equipment industry came up with one of the sharpest statistical reverses seen in metalworking in some time when it posted a mark of 231.3 (1947-49=100) on its new order index. It was the second best month since the current benchmark was adopted. In July, the index of the Foundry Equipment Manufacturers Association was at a 28-month low of 98.6. The record (235.5) was chalked up in August, 1953. The 1957 monthly average is up to 149.5, slightly ahead of the 1957 monthly average.

A source close the industry declares that the showing in August is not indicative of a trend. The index fluctuates wildly from month to month, and it simply means that some good business was awarded in August. "The industry watches the monthly average over a longer period, and this will help 1957's average to hold at the high level of previous years. But don't expect this to happen again soon," says the spokesman.

Trends Fore and Aft

- Dollar volume of construction activity will be more than $65 billion this year, according to Associated General Contractors of America Inc., representing a 3 per cent gain over 1956. Breakdown: New construction, $47 billion; maintenance and repair, $18 billion. Dollar volume will increase another 4 per cent next year.
- Bookings of material handling equipment hit the lowest point this year in August, totaling only 110.09 per cent of the 1954 average (see chart, Page 138).
- "Chances are that changes in the national output will be relatively small, whatever their direction," says the First National City Bank of New York. The change, as measured by the Federal Reserve Board, has been only about 2 per cent so far this year (see table above).
- Durable goods new orders in August were the lowest since September, 1956. Shipments were the lowest this year (see table above).

PROJECTING TODAY'S PLANT EXPANSION PLANS INTO TOMORROW'S OPERATING COSTS AND PROFITS

Ben Franklin once cautioned a business acquaintance: "Beware of little expenses; a small leak will sink a great ship." No philosophy is more apropos in guiding today's expanding industrialist. The greatest pitfalls in industrial development lie in hidden costs . . . "little expenses" that can undermine tomorrow's profit structure.

In weighing factors involved in an industrial move, a plant site-selection team must avail itself of expert advice and study all relevant data.

Philadelphia's Department of Commerce, Industrial Development Division, now has available a qualified staff to supplement the site-selection team of any industry desiring to investigate opportunities in this City, fourth largest in the United States, and hub of a 100-mile radius market boasting a population of 22,500,000.

The staff applies what it terms the "AAC Formula" to each survey. ANALYSIS of each factor for its relative importance . . . ADDITION of all factors, favorable and unfavorable, for a composite picture . . . COMPARISON with the industry's other site surveys to bring to light possible hidden costs and superficial advantages.

Hidden costs are prevalent in four areas: (1) lack of adequate police and fire protection, the latter resulting in high insurance premiums; (2) lack of adequate water supply and sewage disposal systems, substantially increasing maintenance costs; (3) non-proximity to consumer and raw materials markets and inadequate transportation facilities, creating costly shipping and receiving problems, and (4) lack of qualified personnel, causing additional recruiting and training expenses.

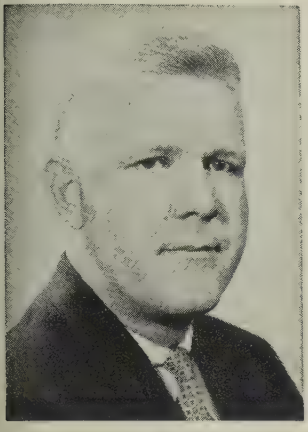
The most deceptive superficial advantages are low land acquisition costs and substantial tax concessions. Both "advantages" disappear when population increases necessitate new schools and other municipal services . . . both may penalize and alienate established industry in the area . . . both rarely offset high maintenance costs.

Utilize Philadelphia's site-selection staff . . . the service is cost-free . . . all inquiries are processed confidentially. Take a close look at industrial land being readied at both city-owned airports . . . sites offering strategic advantages in a stable community where industry can project plans with reasonable accuracy.

"HUB CITY OF TRI-STATE DELAWARE VALLEY"

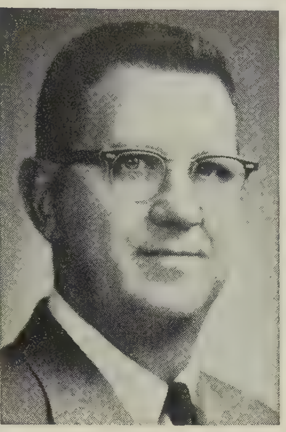
Philadelphia DEPARTMENT OF COMMERCE

INDUSTRIAL DEVELOPMENT DIVISION • *City Hall, Philadelphia 7, Pa.* • FREDRIC R. MANN, Director of Commerce



ELMER M. RICHARDSON
Olin Aluminum marketing

RICHARD C. DIEHL
Universal-Cyclops v. p.



MATTHEW J. BETLEY
Titeflex Inc. president

ARCH C. SHAFER
Benchmaster gen. sales mgr.

Elmer M. Richardson joined **Olin Mathieson Chemical Corp.**, New York, as director of marketing for Olin Aluminum. He was general sales manager, refractories division, H. K. Porter Company Inc.

Richard C. Diehl was elected vice president - operations, **Universal-Cyclops Steel Corp.**, Bridgeville, Pa. He was formerly president of Chase Brass & Copper Co., and served in various management and metallurgical capacities with Wheeling Steel Corp. and Armco Steel Corp.

H. L. Burton Jr. joined **Baron Steel Co.**, Toledo, Ohio, as assistant to the president.

Sherman Products Inc., Royal Oak, Mich., appointed **Warren E. Henderson** sales operations manager; **William W. Wigle**, sales manager, field operations.

Nelson M. Camp joined the purchasing department of **Kennecott Copper Corp.** in New York. He was in charge of purchasing for the Chase Metal Works, a division of Chase Brass & Copper Co.

James A. Johnson was made executive assistant to the vice president-general manager, **Western Brass Mills**, division of Olin Mathieson Chemical Corp., East Alton, Ill.

Richard G. Hurlburt was made sales manager of **Oliver Corp.'s** industrial division, which will transfer from Chicago to Cleveland, effective Nov. 1.

Matthew J. Betley was named president of **Titeflex Inc.**, Springfield, Mass., subsidiary of Atlas Corp. Most recently he was a consultant to Gar Wood Industries.

W. W. Eberhart was elected vice president-sales and distribution for **Autoquip Corp.'s** oil hydraulic lifting devices division. He was central division manager, Rotary Lift Co.

The newly merged **Pfaudler Permutit Inc.**, New York, elected officers: **Henry W. Foulds**, chairman; **Ranlet Miner**, vice chairman; **Mercer Brugler**, president; **D. A. Gaudion**, executive vice president; **E. Geisinger**, senior vice president.

W. M. Watkins Jr. was named sales manager of the new seal sales division of **Robertshaw-Fulton Controls Co.**, at Knoxville, Tenn. He is assisted by **George H. Giesler** as applications engineer.

F. C. Berliner was elected vice president, **Maysteel Products Inc.**, Mayville, Wis. He continues as sales manager and as assistant to the president.

Dennis L. Gallogly was made assistant executive engineer, **Cooper-Bessemer Corp.**, Mt. Vernon, Ohio. Formerly chief engineer, product division, he is succeeded by **R. F. Kymer**.

Joseph O. Thill was made Pittsburgh district manager, **H. M. Harper Co.**, Morton Grove, Ill.

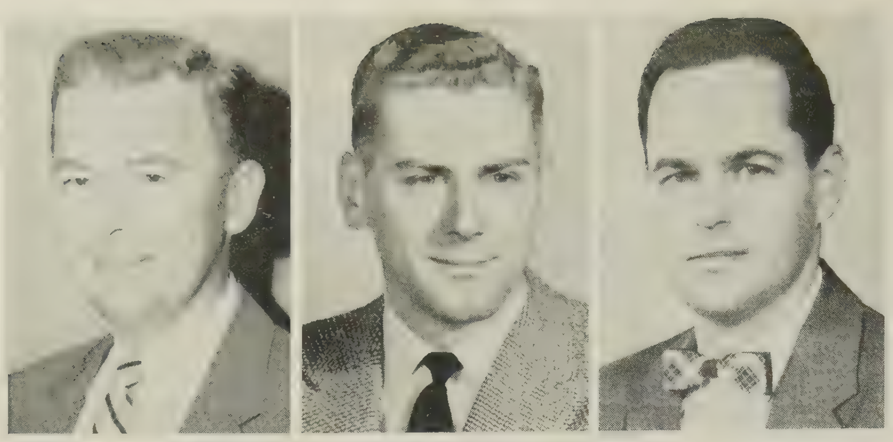
Arch C. Shafer was made general sales manager, **Benchmaster Mfg. Co.**, Gardena, Calif. He was sales manager for Cold Metal Products Co.'s Metallon Div.

A. D. Brown, vice president in charge of **Detroit Steel Corp.'s** eastern strip mill at Hamden, Conn., transfers to Detroit to succeed **Joseph P. Pulte**, vice president-general manager, Detroit strip mill, who retires Nov. 1. Mr. Brown will supervise both the Detroit and eastern strip mills. At the Detroit mill, **Richard A. Schrage** was made general superintendent; **Frederick L. Otto**, assistant general superintendent. At the eastern mill, **Tom R. Adams** was made general manager; **Edward J. Hofer**, manager of sales, New Haven, Conn., district sales office.

Lester C. Hill was made assistant sales manager of **Crucible Steel Co. of America's Pittsburgh Crucible Sales Div.**, Pittsburgh. Mr. Hill was sales manager, Vulcan Crucible Steel Div., H. K. Porter Company Inc.

Carl O. Windrath was made works manager, Rome, N. Y., division, **Revere Copper & Brass Inc.** He succeeds **James A. Phillips**, now an assistant general manufacturing manager at Revere's executive offices in New York. Other appointments at the Rome division: **Fred L. Meiss Jr.**, assistant works manager; **James M. Kennedy Jr.**, chief engineer.

Arnold J. Martin was appointed



LOWELL JENSEN BERNARD MATTER RONALD ASHENFELTER

promotions at Famco Machine Co.

vice president, **Samuel Greenfield Co. Inc.**, Buffalo.

Famco Machine Co., Kenosha, Wis., appointed **Lowell Jensen** works manager; **Bernard Matter**, chief engineer; **Ronald Ashenfelter**, chief purchasing agent. **John E. Glebs** was made vice president-controller.

J. H. Schliesleder was elected president of **Bearings Inc.**, Milwaukee, to succeed the late **William Farrell**. **J. H. Connell** succeeds Mr. Schliesleder as treasurer and sales manager.

Herbert H. Bloom, one-time president of Massey-Harris-Ferguson Inc., joined **J. I. Case Co.**, Milwaukee, to become president of its recently organized subsidiary, J. I. Case International.

Thomas M. Nourse was named head of central station sales for **Hagan Chemicals & Controls Inc.**, Pittsburgh. He is replaced as Pittsburgh district manager by **Louis C. Bishop.**

Fred B. Hout, vice president-sales, was named president of **Barnes Mfg. Co.**, Mansfield, Ohio, to succeed **M. H. Pryor**, who becomes chairman.

Arch Wallen was made factory manager, Northrop Div., **Northrop Aircraft Inc.**, Hawthorne, Calif.

Peter J. Hackett was made executive vice president and general manager of **Riordan Engineering Co.**, Los Angeles.

John W. McGovern was elected president and chief operating officer of **United States Rubber Co.**, New York. Formerly executive vice president, he succeeds **H. E. Humphreys Jr.**, who continues as chairman and chief executive officer.

J. Warren Ogletree was made chief engineer-manufacturing; **Thomas J. Gibbs**, assistant chief engineer at U. S. Steel Corp.'s **Tennessee Coal & Iron Div.**, Birmingham.

David H. Kinder was named research and development chemist by **MacDermid Inc.**, Waterbury, Conn.

John H. Caldwell was promoted to assistant sales manager, protective coatings division, **Pittsburgh Coke & Chemical Co.**, Pittsburgh. He was regional sales manager in Houston.

Fred W. Bush was elected president, **Vinson Steel & Aluminum Co.**, Houston. Formerly executive vice president, he succeeds **Granville B. Lane**, who retires Dec. 31. **Ralph A. Castillo** was made manager of the Houston warehouse.

Dr. Peter Fortescue joined **General Atomic Div.**, General Dynamics Corp., San Diego, Calif., as chief research and development engineer.

Blaw-Knox Co. appointed **Robert E. Walsh** regional vice president in the Chicago area. He continues supervision of roll sales in the area, and maintains his present office at the East Chicago, Ind., Works.

Edward Hoffart was made chief engineer, **Topp Mfg. Co.**, Los Angeles, division of Topp Industries Inc. He replaces **R. L. Baddorf**, named technical assistant to the president.

Richard B. Gewetzki was made director of procurement at **Wells Aluminum Corp.**, North Liberty, Ind.

R. J. Grubba, chief engineer, was appointed vice president-engineering, **Wettlaufer Engineering Corp.**, Detroit. **Oren Downs** was promoted to superintendent of metal fabrication to replace **O. C. Davidson.**

George M. Kovac was made director of the engineering department of **Ren Plastics Inc.**, Lansing, Mich. He was with Cog Corp.

William F. Gearhart was appointed die sales co-ordinator for **Kennametal Inc.**, Latrobe, Pa. **Roger M. McCray** succeeds **George J. Raible**, retired, as Cincinnati district manager.

Louis W. Hamper Jr. fills the new post of assistant to the vice president in charge of Gibson sales for **Gibson Refrigerator Co.**, division of Hupp Corp., Greenville, Mich.

Ralph L. Hitz was appointed sales and service engineer for **Tri-Belt Div.**, Sparton Corp., Jackson, Mich. He was sales manager, Gilbert Mfg. Co.

John C. Jett was made eastern division sales representative in Pittsburgh for **National Supply Co.** He succeeds **William Van Vleet**, retired.

Frank J. Bias was made manager of transmitter engineering for **General Electric Co.'s** technical products department, Syracuse, N. Y. **Harold G. Towlson** was made manager of engineering for the department.

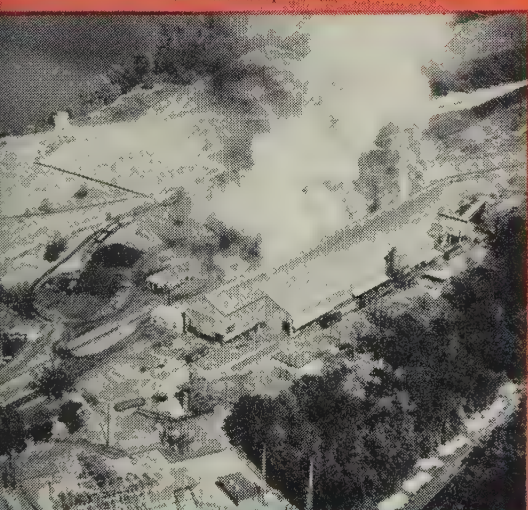
Warner Electric Brake & Clutch Co., Beloit, Wis., appointed **John A. Kriva** manager of manufacturing engineering for its industrial division.

Edward H. Baxa was appointed manager of the processing machinery department of **Allis-Chalmers Mfg. Co.**, Milwaukee. He succeeds **R. L. Halsted**, recently named gen-

Let's Talk About Alloys

NIAGARA FALLS, N. Y.

CHARLESTON, S. C.



CALVERT CITY, KY.

Pittsburgh Met works hand in hand with the steel industry to improve its present products and to develop new methods and alloys which are better suited to the industry's needs. Experimental units are continually in operation in furthering this research.

We fully recognize that the cost of alloys bears a direct relationship to the cost of producing steel. For that reason, we employ and utilize both in research and production the services of personnel who have received their training in the steel industry and who fully understand alloy application and utilization. By so doing we have been unusually successful in bringing about appreciable cost savings by steel manufacturers and have been equally successful in developing and perfecting new alloys to do the job better.

The development and introduction to the steel industry of medium carbon ferrochrome as a substitute for the more expensive low carbon ferrochrome is a definite example of this program of cooperation. Other product refinements growing out of our alloy "know how" have similarly contributed to the steelmaker's art.

Your problems are our problems and we continue to offer our full cooperation and resources in assisting the steel industry to reduce costs while improving quality.

We are a major producer of:

High Carbon Ferrochrome
High Carbon Ferrochrome — Low Sulphur
Medium Carbon Ferrochrome
Low Carbon Ferrochrome Silicon
Ferrosilicon — All Grades
High Silicon Alloy Pig Iron
High Silicon Pig Iron — 14% to 17% Grades
Silico Manganese
Standard Ferromanganese
Special Ferro Alloys

Our plants are strategically located at Niagara Falls, N. Y., Charleston, S. C. and Calvert City, Ky., to serve you promptly via railroad, water transportation and motor freight.

ittsburgh Metallurgical Company, Inc.

GENERAL OFFICES.......................NIAGARA FALLS, NEW YORK

District Offices

AGO CLEVELAND DETROIT PITTSBURGH PHILADELPHIA

DONALD A. MacRITCHIE
Artisan Metal v. p.

DAVID M. GASKILL
joins Airborne Instruments

JOHN A. WENTWORTH
Associated Spring div. mgr.

eral manager, industrial equipment division.

Donald A. MacRitchie was elected vice president and general manager, **Artisan Metal Works Co.,** Cleveland. He was vice president-sales and engineering. He succeeds **Jack G. Allen,** former president and general manager, who resigned to join a family business, Allen & Son Iron Works, in California. **Arthur C. Lundgren,** chairman, also will be president.

David M. Gaskill was appointed manager of industrial product sales for **Airborne Instruments Laboratory,** Mineola, N. Y. He was manager of industrial equipment for Brush Electronics Co.

Paul R. Barrett joined **Lockhart Iron & Steel Co.,** McKees Rocks, Pa. He will supervise sales of carbon and alloy steel billets; also sales of warehouse stocks of carbon steel. Mr. Barrett was with C. A. Waite Co.

United Engineering & Foundry Co., Pittsburgh, appointed **William H. Betts** staff metallurgist. He was sales and service engineer in the roll division.

Raphael J. Larko was made product manager of ventilators for **American Steel Band Co.,** Pittsburgh. He was formerly with Burt Mfg. Co.

Clifford A. Winans was promoted to superintendent of diecast operations at **Brown-Lipe-Chapin Div.,** General Motors Corp., Syracuse, N. Y.

Elmer E. Babos was made sales manager, **Ohio Structural Steel** Co., Newton Falls, Ohio.

John A. Wentworth was made general manager, **Associated Spring Corp.'s** Ohio division, Dayton, Ohio. He succeeds **Harry B. Dauphinais,** recently made general manager of the corporation's William D. Gibson Co. division. Mr. Wentworth was assistant manager, Spring Works, Wallace Barnes Div.

Chester S. Johns was made sales manager, **Buhr Machine Tool Co.,** Ann Arbor, Mich. He was with Cross Co.

Walter E. Thill was made chief engineer of the new service engineering department of **Federal-Mogul-Bower Bearings Inc.,** Detroit.

Charles M. Albritton was named vice president - manufacturing, **Huck Mfg. Co.,** Detroit. He was plant manager.

William W. Kearney was made manager, production control, **Baker-Raulang Co.,** Cleveland, subsidiary of Otis Elevator Co. He was manager of planning and materials at the electronics division of Otis.

Paterson-Leitch Co., Cleveland, appointed **Arthur F. Besch** sales manager; **Carl A. Beutel,** assistant sales manager. Mr. Besch formerly served as purchasing agent and manager of the warehouse department.

Joseph E. Praser was made general superintendent, Cleveland steel service plant, **Joseph T. Ryerson & Son Inc.** He replaces **James J. Connaughton,** now assistant to the general manager.

Frank W. Jenks was elected president, **International Harvester Co.,** Chicago, succeeding **Peter V. Moulder,** retired. Mr. Jenks was executive vice president.

Robert B. Ganley joined **Syracuse Heat Treating Corp.,** Syracuse, N. Y., as vice president and general manager. He was with Sanderson-Halcomb Div., **Crucible** Steel Co. of America.

Joseph S. McVey Jr. was made casting design engineer for **Everett-Lynn Foundries,** General Electric Co., Schenectady, N. Y.

James E. Kennerly joined the labotory staff of **Lea Mfg. Co.,** Waterbury, Conn. He was finishing superintendent, Bassick-Sack Div., Stewart-Warner Corp.

Kelly G. Smith was made quality control manager; **George Gasper,** chief tool engineer at **Chance Vought Aircraft Inc.,** Dallas.

OBITUARIES...

Gilbert Butler, 70, former president and general manager, **Bossert Co.,** Utica, N. Y., died Oct. 13.

E. B. Greene, 79, former chairman, **Cleveland-Cliffs Iron Co.,** Cleveland, died Oct. 20.

Arnold J. Malcolm, 62, president and chairman, **Erin Industries Inc.,** San Diego, Calif., died Oct. 12.

Albert H. Clarke, 54, vice president-manufacturing, **Crouse-Hinds Co.,** Syracuse, N. Y., died Oct. 9.

Harold W. Melampy, 50, general manager, **Roto Mfg. Co.,** Xenia, Ohio, died Oct. 8.

John Follansbee, 89, retired chairman, **Follansbee Steel Corp.,** Pittsburgh, died Oct. 9.

William F. Syring, secretary-treasurer, **Apex Bolt Products Co.,** Chicago, died Oct. 8.

Gilbert Butler, 70, former president, **Bossert Corp.,** Utica, N. Y., died Oct. 13.

Robert G. Shinabarger, 63, general sales manager, **New Holland Machine Co.,** New Holland, Pa., division of **Sperry Rand Corp.,** died Oct. 15.

U. S. Industries Inc. Reorganizes

Manufacturing and marketing functions are consolidated in three major divisions in move to establish better earning position. Heavier competition, low profit margins cited

U. S. INDUSTRIES Inc., New York, a diversified organization with most of its operations in the metalworking field, has reorganized and consolidated manufacturing and marketing functions in three major divisions along "product group" lines.

"The reorganization was prompted," says John I. Snyder Jr., president and chairman, "by long range studies which proved to us that it is possible to establish a substantially better profit position in spite of today's heavy competition and the low profit margins that prevail generally. All the projected changes are in the interest of better operating and marketing efficiency, designed to increase both sales, and, more important, earnings."

Divisions—Divisions affected are: Axelson Mfg. Co., Los Angeles (engine lathes, petroleum production equipment, and aircraft components); Clearing Machine Corp., Chicago (metalworking presses); and Western Design & Mfg. Corp., Santa Barbara, Calif. (electronic systems and components for aircraft and guided missiles).

Axelson's engine lathe production operation is being moved to the Clearing Machine Div., which has plants in Chicago and Hamilton, Ohio. The lathes will be manufactured by Clearing, but they will continue to be sold by Clearing under the Axelson name.

Aircraft Operations—Axelson's aircraft production, principally involving landing gear, struts, and hydraulic equipment, has been consolidated with Western Design for administrative purposes. Axelson's new aircraft facility at Montebello, Calif., will branch out into the manufacture of electronic and electromechanical devices developed by Western Design. The combined operation will be under the direct supervision of C. W. Sponsel, president of Western Design.

Machine Tools—"Along product group lines," Mr. Snyder points out, "Clearing Machine becomes our central producer of heavy duty machine tools—presses and lathes. We are creating a central facility for the production of aircraft components and electronic and electromechanical devices in Montebello. Axelson, already a major producer of oil field equipment . . . will expand even more in this field by concentrating all its efforts along these lines on a wider product basis."

He adds that the big potential market for engine lathes lies more within Clearing's geographical area in the Midwest than it does on the West Coast. Axelson has not been earning profits with its lathe operation, he points out. "The basic difficulty is the limited market on the West Coast. It became clear that since the largest market for lathes is in the Midwest, and since many lathe manufactures are situated there, Axelson was running its lathe operation at a competitive disadvantage on the basis of freight rates alone. We are sure," Mr. Snyder asserts, "that this will be corrected when we move lathe manufacture to the Clearing Div."

Oliver To Move Division

Industrial Div. headquarters of Oliver Corp., Chicago, will be transferred to Cleveland, effective Nov. 1. The corporation makes farm and industrial equipment. The division offices will be in Oliver's Cleveland plant, which produces crawler tractors and attachments. R. G. Hurlburt has been appointed sales manager of the Industrial Div.

SPS Offers Novel Service

Standard Pressed Steel Co., Jenkintown, Pa., is establishing a coast-to-coast network of screw-thread measuring laboratories to help industry with fastener fit and gaging problems. Three identical screw-thread metrology laboratories will be opened early in 1958 at company plants at Jenkintown, Cleveland, and Los Angeles.

Primary goals will be to help industry meet increasing demands for mechanical precision in nuclear and missile applications and to reduce production losses resulting from fastener assembly problems.

U. S. Steel Shifts Division

United States Steel Corp., Pittsburgh, will operate its Gerrard Steel Strapping Div. as part of United States Steel Supply Div., Chicago. Clifford F. Hood, president, said that this move, in the direction of simplification of organizational structure, is designed to provide improved service to Gerrard customers. Gerrard Steel Strapping supplies flat and round steel strapping service to all types of industries.

Atlanta Firm Renamed

Southern States Iron Roofing Co., Atlanta, a subsidiary of Reynolds Metals Co., Louisville, changed its name to Reynolds Aluminum Supply Co. The firm operates manufacturing plants in Atlanta and Birmingham and maintains nine distribution centers.

Moves Missile Operations

Electronics Engineering Co., Santa Ana, Calif., closed its Florida Div. offices and transferred its research and development operations at Cape Canaveral (Fla.) Missile Test Center to the company's main laboratory in Santa Ana. The firm has designed and developed missile range instrumentation equipment for the Air Force base at a cost of more than $4 million.

Installs Extrusion Press

Great Lakes Carbon Corp.'s Electrode Div., New York, has placed in operation an extrusion press designed for production of graphite anodes and other small cross-sectional pieces. The press is part of a new graphite producing system (including weighing and mixing facilities) which has a revolutionary cooling runway, says R. B. Wittenberg, vice president of

(*Please turn to Page* 150)

DU PONT PRODUCT NEWS

New Du Pont cost-analysis method helps you save money two ways

• Du Pont's exclusive cost-analysis method can help you cut cleaning costs or help you choose the best cleaning process for your needs. This new service is now available at no cost or obligation. Check coupon for more details.

Du Pont and its distributors of "Triclene" D® trichlorethylene now offer an accurate method for analyzing all costs involved in metal cleaning. This new Du Pont service can save you money by helping you (1) determine where present cleaning costs can be cut, or (2) choose the most efficient cleaning process if you're expanding or planning a new installation.

Du Pont's exclusive cost-analysis method combines 25 years of metal-cleaning experience with proven cost-accounting procedures. The result is a simplified and thoroughly reliable way to compare all costs of various cleaning processes or of alternate methods of handling your present cleaning operation.

Du Pont's cost analysis gives you a *complete* cost picture and doesn't stop with the obvious, and usually misleading, cost factors such as equipment, solvent or chemicals. You'll be able to answer any question about your cleaning costs confidently and instantly spot those that are out of line.

Du Pont, or its distributors of "Triclene" D, will be glad to give you full details. Whether it's cutting costs, improving your present cleaning results or trying to decide which cleaning process is best for you—you can get accurate answers using Du Pont's proven cost-analysis method. Use the coupon for prompt attention.

• Conveyorized vapor-degreasing unit cleans oil, grease and chips from machined aircraft cylinders.

Why vapor degreasing with "TRICLENE" D® is ideal for assembly-line cleaning

It's fast —Vapor degreasing with "Triclene" D removes grease, oil, cutting compounds and other contaminants—usually in less than a minute!

It's thorough —Vapor degreasing with "Triclene" D leaves parts clean and dry—instantly ready for the next operation; never causes etching or staining—leaves no deposits of any kind.

It's versatile —Vapor degreasing with "Triclene" D will clean parts made of all common metals and alloys, in any size or shape.

It's economical —Vapor-degreasing equipment is compact and inexpensive to install. Parts come out dry, eliminating need for dryers—saves valuable floor space. You'll find that the superior cleaning action of "Triclene" D eliminates rejects, cuts downtime.

It's easy to operate —Anyone can do it. In fact, vapor degreasers can be run automatically. Du Pont will be glad to provide instructions for proper operation of your vapor degreasers if you wish.

▶ **If you would like to know more about degreasing, or want to be sure you're getting the most efficient cleaning from your present degreaser, call your Du Pont "Triclene" D distributor. If needed, he can call in one of Du Pont's metal-cleaning experts. You can also contact any Du Pont district sales office or use the coupon at right.**

(Concluded from Page 147)

the corporation and general manager of the division.

Republic Sells Chain Unit

Republic Steel Corp., Cleveland, sold the machinery, tools, inventories, and equipment of its Chain Div. to Campbell Chain Co., York, Pa., and has discontinued production of chain. Republic retains all other assets of the division, principally the land and buildings of the Cleveland plant at 4801 Chaincraft Rd.

Tata Steel Expanding

Kaiser Overseas Engineering Corp., Oakland, Calif., will complete its $135-million expansion of Tata Steel Works, Jamshedpur, India, well ahead of schedule early next spring.

NEW PLANTS

Power was turned on for the first time Oct. 9 in the $12-million plant of **Hooker Chemicals Ltd.,** Vancouver, B. C. The plant has a rated daily capacity to produce 110 tons of 50 per cent and 73 per cent caustic soda, 100 tons of chlorine, and 1 million cu ft of hydrogen. A $3.5-million research center is being built on Grand Island, B. C., to serve the eight plants of Hooker Electrochemical Co., Niagara Falls, N. Y., parent organization.

Rich Steel Co., distributor of carbon steel sheets, strip, bars, and tin mill products, is constructing a 33,000 sq-ft warehouse at 5930 Bandini Blvd., Los Angeles.

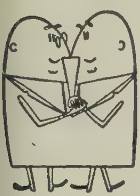
Uranium Reduction Co., Moab, Utah, dedicated its $9-million mill which is managed by **American Zinc, Lead & Smelting Co.,** St. Louis.

Pheoll Mfg. Co., Chicago, producer of metal fasteners, acquired a 76,000 sq-ft plant at Michigan City, Ind. Noland McDonald is general manager of the new plant.

Sta-Rite Products Inc., Delavan, Wis., plans to build a plant there in

which to consolidate part of its manufacturing operations now situated at Delavan and at Sharon, Ill.

Chase Brass & Copper Co., Waterbury, Conn., opened a new warehouse and district sales office at 230 Shaw Rd., South San Francisco, Calif. The building contains about 62,000 sq ft of space.



CONSOLIDATIONS

Midland Steel Products Co., Cleveland, and **J. O. Ross Engineering Corp.,** New York, will merge, subject to approval by shareholders next month. The consolidated organization will be known as Midland-Ross Corp. with executive offices in Cleveland. It will operate four divisions: Cleveland, Detroit, and Owosso (Mich.) divisions of Midland; and J. O. Ross Engineering Div., including the Ross subsidiaries.

Saxton W. Fletcher, president of Ross, will be president of the J. O. Ross Engineering Div. and a vice president of Midland-Ross.

Midland Steel produces frames, power brakes, and air compressors for transportation vehicles, and for construction and industrial machinery. The Ross organization (with its subsidiaries) engineers, designs, and manufactures atmosphere-control systems. It offers complete systems for finishing and painting products and makes a broad line of couplings, and coating and printing equipment.

Ray-O-Vac Co., Madison, Wis., is merging with **Electric Storage Battery Co.,** Philadelphia, and will be operated as the Ray-O-Vac Div.

Maysteel Products Inc., Milwaukee, purchased **Magnesium Products of Milwaukee** and will operate it as a subsidiary. The acquisition puts Maysteel in the magnesium field for the first time. Maysteel's products include office equipment, engine and compressor housings, circuit breaker tanks, vending machines, road and farm machinery components, lathe benches, hospital cabinets, and patient wardrobes. Its subsidiary, Gleason


Everybody profits
...because
you
belong
in this
picture!
The publisher of this magazine is often asked what kind of a man you are . . . and how many like you are receiving his magazine.
Why is he asked?
Because the *advertisers* (whose money is his chief income) insist upon knowing the types of people (by industry or profession, by title) for whom the magazine is edited — and how many are getting it.
In order to standardize on the presentation of such information to advertisers and to have its accuracy vouched for by a disinterested third party, nearly 450 publishers have joined some 200 leading advertisers and advertising agencies in a non-profit organization called Business Publications Audit.
The purpose of BPA is to assure advertisers . . . by frequently checking and rechecking . . . that each member publisher is indeed distributing his magazine, in the *numbers* promised, to the *types* of men he promised would receive it.
The BPA symbol in this magazine means that *you belong* . . . that because of your occupational interests you are qualified, in the eyes of the advertisers, to receive it.
The advertiser can thus tell whether he's getting his money's worth.
The publisher has a better sales story to prospective advertisers because his magazine is "audited."
And you, the reader, get more value from the magazine because both the advertisers and editors, knowing what your special occupation is and what your interests are, are better able to prepare advertising and editorial material that will be most informative and useful to you.
What you can do
Publishers and advertisers frequently write to magazine readers to learn what kind of articles and advertisements appeal most. Cooperate with them — will you? — by answering their questions . . . in the interest of better communications between makers and markets.
BUSINESS PUBLICATIONS AUDIT OF CIRCULATION, INC.
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eel Corp., makes cable and hose eels. Magnesium Products makes ock boards, material handling pecialties, portable radar towers nd shelters, and airborne-elecronic components and frames.

Wagner Bros. Inc., Detroit, proucer of chemical supplies and auomatic plating machines, purhased the **Automatic Molding Mahine Co.**, Los Angeles.

Haveg Industries Inc., Wilmingon, Del., purchased **Lithgow Chemical Co.** of California (Torance), manufacturer and applicaor of plastic coatings which reist chemical corrosion, cements, mpregnations, and laminated linngs. Haveg produces chemicalcorrosive plastics and plastic coatngs.

Gulton Industries Inc., Metuchen, N. J., acquired **Titania Electric Corp. of Canada Ltd.**, Gananoque, Ont. Operations of the Canadian subsidiary will include the manufacture of most of the major electronic and ultrasonic instruments and components produced by the parent firm. Dr. L. K. Gulton is president of the new subsidiary; Max Fallis, general manager.

Hubbell Metals Inc., St. Louis, purchased **Graco Steel Co.**, Louisville, distributor and processor of sheet and strip steel.

Graton & Knight Co. Inc., manufacturer of industrial leather products, purchased **Warren Belting Co.** and will operate the property as a division. Both firms are situated in Worcester, Mass. Plans include expansion of the Mechanical Packings Div., enlargement of the Case & Strap Div., and establishment of additional facilities for increased production of nylon core belting.

NEW ADDRESSES

Booz, Allen Applied Research Inc. (formerly Applied Research Inc.) moved its headquarters to 430 Green Bay Rd., Kenilworth, Ill. Dr. R. P. Petersen is president.

(*Please turn to Page* 158)

CINCINNATI PRECISION IS TAILORED* TO

all new inductron

INDUCTION HARDENING MACHINE

Cincinnati's new Inductron® offers more advantages in performance, flexibility, ease of operation, and reliability of component life than any similar equipment previously offered to industry. Built in 15, 30 and 50 KW capacities, these machines operate at frequencies up to approx. 1000 KC for faster heating, thinner case, greater freedom from scale and distortion.

All units are wired and equipped to operate on either voltage, 220/440. Power, in the smoothest form of d.c. possible, is adjustable over the entire range, using only a basic rectifier circuit with low-cost, long-life rectifier tubes. The standard Inductron has a manually adjustable output transformer to accommodate a wide range of workpieces. A self-contained, externally variable output RF transformer can be provided at extra cost. The feed back (grid drive) system is self-regulating and requires no adjustment when changing work coils or transformer position, over the entire power range.

Many more design advantages—in component and circuitry construction, in controls and instruments—are incorporated. Throughout, the new Cincinnati Inductron assures you highest operating efficiency with maximum component life.

At the Metal Show see the INDUCTRON

simultaneously hardening both ends of Chrysler push rods. Rods are 5/16″ x 11.58″, SAE 1056 steel. Special fixture feeds rods through work coils into oil quench.

***BUILDING BLOCK CONSTRUCTION**

CINCINNATI

flamatic and inductron *hardening machines*

in Action at the **METAL SHOW**

(*Concluded from Page* 155)

Production Machinery Corp., Mentor, Ohio, moved its engineering and sales offices to larger quarters at Maple Street and Nickel Plate Railroad, that city. The firm builds metal processing equipment.

A. K. Allen Co. Inc. moved to larger quarters at 255 E. Second St., Mineola, N. Y. The firm makes air cylinders, air valves, and indexing dial feed tables.

Automotive Engine Rebuiders Association moved its main offices to 901-903 Roosevelt Bldg., 9 N. Illinois St., Indianapolis 4, Ind.

ASSOCIATIONS

N. P. Hayes, president of Carolina Steel & Iron Co., Greensboro, N. C., was re-elected president of the **American Institute of Steel Construction Inc.**, New York. Other officers who also were re-elected are: First vice president, H. B. Dietrich, Dietrich Bros. Inc., Baltimore; second vice president, J. M. Straub, Fort Pitt Bridge Works, Pittsburgh; treasurer, E. P. Stupp, Stupp Bros. Bridge & Iron Co., St. Louis. M. Harvey Smedley is secretary, while L. Abbett Post is executive vice president.

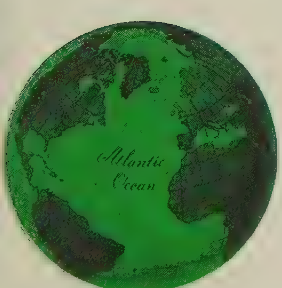
W. M. Goldsmith, secretary-treasurer of the Dave Chapman Industrial Design office of Chicago, was elected president of the **American Society of Industrial Designers**, New York.

Roland J. Ahern, president and general manager of the Billings & Spencer Co., Hartford, Conn., was elected president of the **Service Tools Institute**, New York.

Pennsylvania Ceramics Association, Pittsburgh, elected these officers for two-year terms: President, Ernest M. Hommel, O. Hommel Co., Pittsburgh; first vice president, John Clark, Foote Mineral Co., Philadelphia; second vice president, George Reuning, Big Savage Refractories Corp., Frostburg, Md.; managing director, J. K. Martin, Posey Iron Works Inc., Lancaster, Pa.

STEEL
The Metalworking Weekly

The Metal Show Section



The 2nd World Metallurgical Congress and 39th National Metal Exposition

Metal Selection Puts Plus in Profits

EACH YEAR brings a crop of new alloys.

Many are modifications of the familiar that accent some vital property. Some reflect improved technology in production. A few are all new.

The problem is to keep current. Many of the new ones develop into important engineering materials that obsolete their competitors. That's a consideration of consequence when you realize that materials can be the biggest single item of cost in the manufacture of a product.

It means management must be sure its people are informed . . . that they are selecting and buying the best metal for an application in its most economical form.

STEEL's Metal Selector (opposite Page 168) was developed to help you do a better job in materials management. It compiles data on types and uses of many alloys needed in today's manufacturing.

Included are tables on: 1. Wrought and casting copper alloys. 2. Wrought and casting aluminum alloys. 3. Ferrous castings. 4. Magnesium. 5. Titanium. 6. Zinc diecasting alloys. 7. Alloy and H-steels. 8. Stainless and heat resistant steels.

This Selector supplements last year's (STEEL, Oct. 1, 1956, opp. p. 162), which dealt with special alloys: 1. High strength, low alloy steels. 2. Superstrength steels. 3. Leaded steels. 4. Vacuum melted metals. 5. High temperature alloys. 6. Corrosion and heat resistant castings. 7. Spring alloys. 8. Special copper alloys. A new edition of last year's Selector for Special Alloys is planned for the 1958 Metal Show issue.

Alloy and H-Steels

Today, 188 types of alloy and H-steels are designated as standard by the American Iron & Steel Institute.

Studies by AISI in co-operation with the Society of Automotive Engineers have resulted in this simplified list of compositions for engineering applications. Previously, many more analyses were in use. In many cases variations in their compositions were too small to be of any real significance.

The 1955-57 period saw further standardization of the standard alloy and H-steels. Although a few new compositions were added (including a nitriding steel), this year's Selector has 50 less alloys than the 1955 edition.

Definition of Alloy—One or more alloying elements are added to pro-

duce properties that cannot be obtained in carbon steel. Generally, it's advisable to use alloy steels when requirements call for more strength, ductility, and toughness than can be obtained from carbon steel in the section under consideration.

Trends — Steels such as 2300, 2500, and some of the 3100 grades were dropped from the new AISI-SAE lists because users had trouble getting them during the nickel shortage. They turned to other alloys and increased the carbon content to get the hardenability they needed.

A new alloy with no nickel, 4012, has replaced 4608 for use in bearings. Alloy 8822 has been added to take the place of some 4800 steels and conserve nickel.

Some of the 8700s were taken out because 8600s can be used instead in some applications and are cheaper because of their lower molybdenum content.

Triple Alloys—Nickel-chromium-molybdenum steels may offer economy in use over cheaper single alloy compositions. For example, residual nickel, chromium, or molybdenum in a single alloy steel will vary from heat to heat. Potential areas of trouble include variations in hardenability, annealing difficulties, and distortion in heat treating.

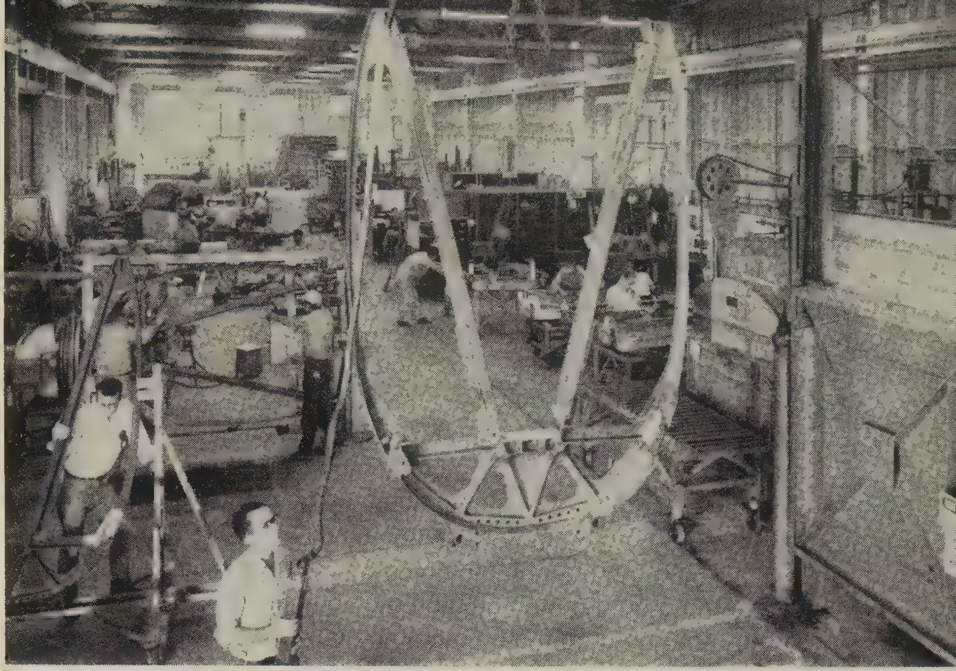
The extra cost of a composition in which nickel, chromium, and molybdenum are controlled can be repaid several times by more uniform heat treating results.

Boron—It's added to steel for one purpose: To increase hardenability. Such steels are identified by the letter B in the grade number and contain a minimum of 0.0005 per cent boron.

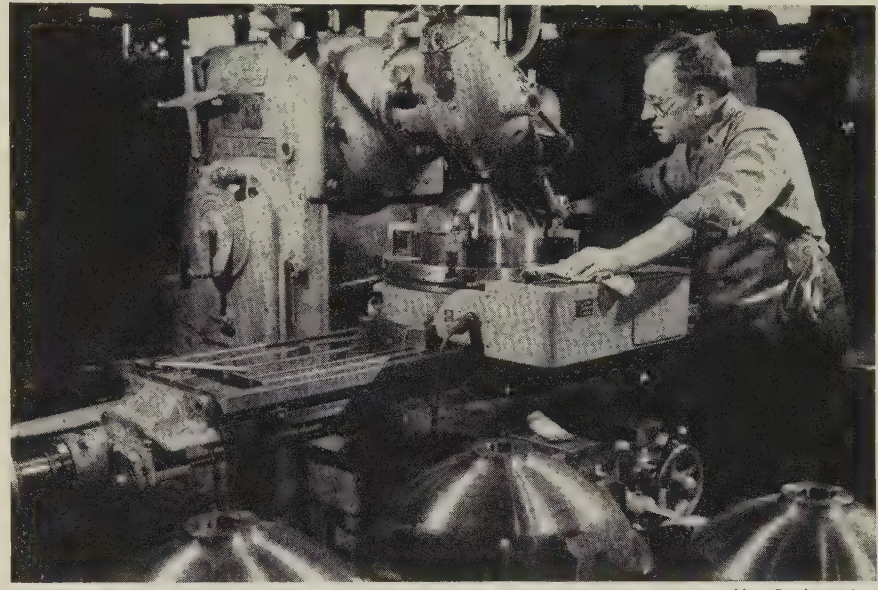
Boron is valuable for increasing the hardenability of leaner alloys. It's used most frequently in the 0.30 to 0.50 per cent carbon range. Grades 94B30 and 94B40 are used for spindles and axles. Makers of hand tools are using boron grades.

Caution—It's not good practice to chose an "overalloyed" grade for a small section. It may increase susceptibility to quenching cracks.

Through-hardening may be undesirable for some uses, such as shock applications. A softer core is needed to avoid breakage.



Rohr Aircraft Corp.



Alco Products Inc.

More Alloy Steels Go Into Aircraft and Missiles—Top photo shows fuselage main bulkhead, an alloy steel weldment heat treated to 180,000-200,000 psi ultimate. Bottom photo shows air flask for the Terrier missile being machined from 4340

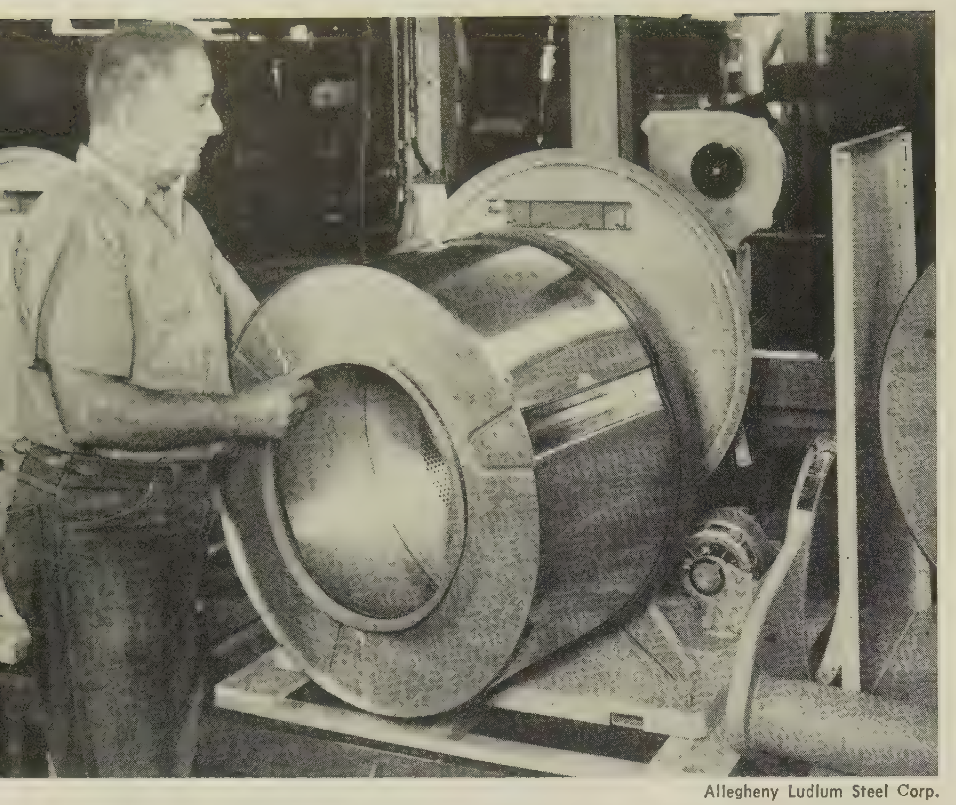
Factors in addition to hardenability often are pertinent. They arise when service conditions such as heavy shock, low temperature impact, and creep resistance are involved.

Specify—To identify steels specified to hardenability band limits, the suffix H is added to the regular series number. It's important that purchasers use the suffix when they specify; there is no other way to determine when hardenability band limits apply.

Aircraft—More alloy steels are finding their way into aircraft. Specifications are demanding higher transverse properties. Steel companies are accepting requests for 12 per cent reduction in area at the 260,000 to 280,000 tensile strength level. Physical property requirements are expected to go higher.

Stainless Steels

There are 39 grades of stainless and heat resistant steels designated as standard by the American Iron



Allegheny Ludlum Steel Corp.

Stainless Series 200 Finds New Uses—Type 201 is used for drum going into home laundry dryer

& Steel Institute. Many other stainless alloys are available commercially under several tradenames. (They were covered in STEEL's Metal Selector last year.)

Spur to Growth—Stainless alloys are growing rapidly in number because of the need for new materials of construction for hot aircraft, atomic reactors, and missiles. Fabricators are using more of it in industrial and domestic applications.

Auto Uses—Stainless is finding more functional uses in automotive parts. Last year, three applications passed from the development to the acceptance stage: An oil ring expander, radiator tanks, and oil cooler assemblies.

Architectural applications are taking more stainless—as prefabricated panels that are assembled to form walls and as decorative trim.

Fabricators are making more stainless products for the farm. Refrigerated tanks for handling fresh milk in large quantities have been on the scene for some time. A liquid fertilizer dispenser is being introduced.

The refrigerated milk dispenser is one of the most promising new products. Commercial models are being used in schools and restaurants. Scaled-down versions for the home will keep milk "on tap," releasing space taken by containers for other uses.

The new types 201 and 202 are receiving more attention by fabricators using them as alternates for the higher nickel austenitic grades. They are finding use in railway cars, truck bodies, restaurant and institutional equipment, household utensils and appliances, and several architectural applications, such as exterior panels, window frames, doors, hardware, and elevator panels.

The designer should be familiar with the whole family of stainless steels. Intelligent selection can pay off in design improvements and cost savings.

Aluminum

A new heat treatable alloy, X6463, gives the brightest finish ever obtained on a commercial aluminum extrusion. Automotive, architectural, and appliance users will adopt it for bumpers, grilles, trim panels, window frames, emblems, and lettering.

More Strength — Plates rolled from 5456 have the highest mechanical properties available among alloys that are not heat treatable. The alloy meets U. S. Navy specifications, has good resistance to corrosion, and excellent welding characteristics. It's well suited for overhead traveling cranes, ship unloaders, gun mounts, carrier elevators, deckhouses, and other heavy duty structures.

The development of alloys 5083 and 5086 has spurred the fabrication of complex structures requiring maximum joint strength and efficiency. Applications are in cranes, trusses, bridges, elevated water tanks, drilling rigs, military vehicles, trucktrailers, railroad car doors, and other transportation equipment.

Alloy X5454 was developed for the fabrication of strong welded structures which must operate at slightly elevated temperatures. Its main application is expected to be in the process industries where heated chemicals are handled in aluminum tanks, truck dump boddies, tubes, and pipe.

Strip Conductor — Electrical equipment makers are studying the use of aluminum strip conductors for such things as welder transformer coils, lift magnet and magnetic clutch coils, and dry type distribution transformers.

Interleaved strip conductors have been approved for use in generator field coils by one automaker; a producer of electrical equipment has approved them for automobile transformers. Development work on horn coils is nearing completion.

Transportation — Automakers are planning to use more aluminum in functional and decorative parts. Some applications: Air cleaners, front crossmembers for radiators, hood latch assembly, hand brake levers, hub caps, door scuff plates, and cooling systems. Look for aluminum bumpers, roof panels, and wheels in the near future. Diecast wheels and engine blocks are under consideration.

Truck and bus builders are using aluminum in body construction, hubs, brake shoes, axle and differential housings, and frame supports. Structural parts and trim are going into house trailers, fur-

nishings, windows, awnings, roofs, and doors.

Railroad applications are receiving more attention. Doors for boxcars, baggage and refrigerator cars, floors and floor racks, loader beams, and other parts are in the test stage. Aluminum hopper cars are being produced.

In conventional aircraft, aluminum is the plane designer's chief metal. New alloys and more efficient forms are being developed to meet specific requirements.

Castings Keep Up — Usage of aluminum casting alloys with higher mechanical properties is proceeding in two directions: 1. Those which offer high strength and high ductility in the as-cast condition are being specified. 2. Heat treatment is being used to give a wide range of high mechanical properties.

The high purity alloys, HP355 and HP356, are of interest to aircraft and missile builders because of their higher strength and ductility.

Piston Alloy—There has been a marked trend away from SAE 321 for pistons; SAE 332 or ASTM SC103A has recently been specified by the SAE and ASTM. Use of aluminum-tin bearing alloys 750 and 700 is growing.

More Zinc Added—In the last few years there has been a strong trend toward the use of more zinc in aluminum casting alloys for sand, permanent mold, and die-casting applications. Many diecasters are using alloys with 2 per cent or more zinc. The chief advantage of higher zinc is better machinability; it also increases the fluidity of the casting.

Magnesium

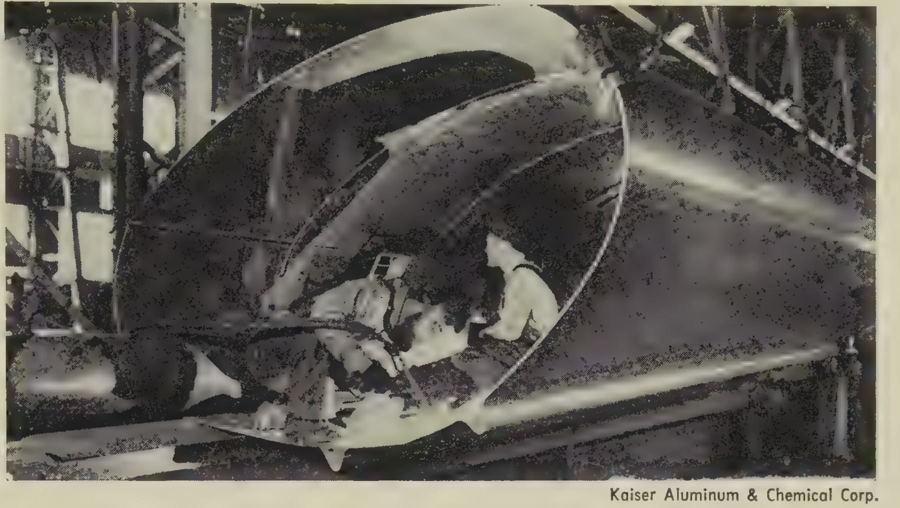
Military standard 409 was issued by the office of the assistant secretary of defense on Feb. 14 to standardize nomenclature and temper designations for magnesium alloys in industry and the Department of Defense. The Army, Navy, and Air Force make its use mandatory.

The alloy nomenclature is based on the system devised by the ASTM and officially adopted by the Magnesium Association.

Progress—New magnesium alloys have been developed for higher strength and elevated temperature applications.

Alloy ZK60A produces high strength extrusions. Pellet material (alloy ZK60XB-B) is being extruded in cross-sectional areas up to 20 sq in. Sections are some 40 per cent stronger than those extruded from conventional billets.

About 4300 lb of pellet-extruded I-beams support the flooring in Douglas Aircraft Co.'s big C-133



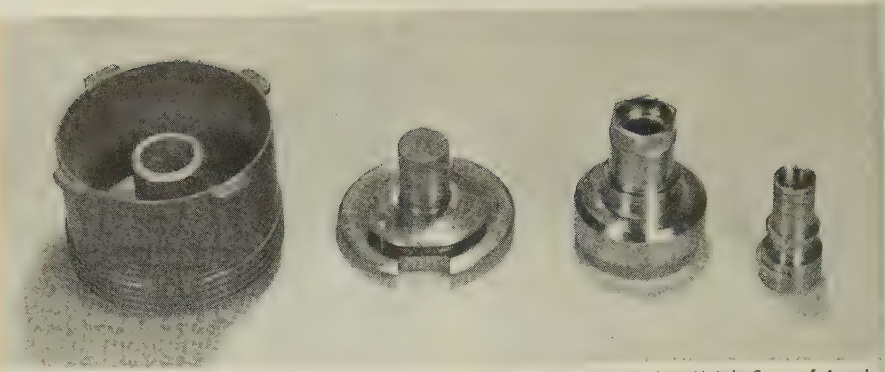
Kaiser Aluminum & Chemical Corp.

New Aluminum Alloys Have Tailored Properties—Top photo shows tank shell of alloy 5086 being welded. It was recently accepted by the ASME for unfired pressure vessels. Trailer in bottom photo is made from 5154 because of its weldability and high strength

Aluminum Co. of America

TITANIUM

New high strength, heat treatable alloys are ready for aircraft and missiles. Civilian market will take more for anticorrosive uses



Titanium Metals Corp. of America

Cylinder and piston parts for bomb ejector made from high strength, heat treatable bar and forging alloy (Ti-155A)

cargo carrier and transport

Heat Resistance — Magnesium alloys containing thorium (HK31) give castings, extrusions, and sheets improved short time tensile properties at 800° F. Creep resistance is improved up to 700° F, and applications in the 300 to 500° F range are extended.

More than 230 lb of magnesium-thorium alloys are used in the airframe and skin of the Bomarc missile.

Zinc Diecastings

ASTM alloys AG40A and AC41A (Zamak 3 and 5) differ only in copper content. They fill requirements for diecasting applications.

The design engineer is calling for parts that require complex dies, the ingenious use of inserts, and the casting of shapes that formerly "couldn't be done." Typical are: Helical gears, feed screws, cored openings on all sides of the casting, different size parts from the same die, and dies that form a complete set of parts, including fasteners, for an entire assembly.

Zinc diecastings are finding these uses in industrial equipment: Heavy duty gear reducers, forced lubrication systems, high speed sewing machines, electric staplers, and spiral feed screws.

New devices for autos use their share. Typical are: Window channels for hardtops, the extension assembly for the window portal, and controls and housings for air conditioners.

Toymakers are using zinc diecastings for pistols, airplanes, autos, tractors, rifles, and trucks.

Titanium

The change in emphasis from piloted aircraft to missiles opens up new uses for this metal—particularly the new heat treatable sheet alloys being introduced.

About two-thirds of the titanium produced for aircraft goes into jet engines; about 10 per cent finds its way into the airframe. It means that the alloys have useful strength to about 900° F and offer weight-saving possibilities at these temperatures.

Missile speeds will be in the thousands of miles per hour, and temperatures produced by aerodynamic heating will rise accordingly. The missile airframe will get hot. The problem will be comparable to the present one on airplane jet engines. Titanium alloys will give the designer valuable strength-weight-temperature properties to work with.

Civilian Move—While principal uses for the immediate future will be in aircraft and missiles, in five to ten years more titanium will probably be used by industry than by aircraft. It's already doing a number of important jobs more economically than other metals—and at today's prices.

Anodizing rack clips are being made from a commercially pure grade. They resist corrosion and do not become nonconducting during anodizing, which saves an extra operation (stripping the rack between cycles).

Outstanding—Corrosion properties make the material stand out for a number of uses in chemical processing and paper mill equipment. It's expected to make important moves into the food equipment field.

Producers of mill products are building up stocks for industrial applications. Reliable sources of supply are developing for tubing, welded fittings, valves, fasteners, flanged heads, and other items required by industry for building equipment.

Ferrous Castings

Users are becoming more specification minded about the quality and properties of castings.

Gray iron is produced with a wide range of mechanical properties. It's a material that may be adjusted by changes in composition, heat extraction, or heat treating.

It's actually a composite material with both metallic and nonmetallic constituents. It can be thought of as a steel interspersed with graphite. Since graphite is structurally weak, its quantity, character, and distribution have an important effect on the physical properties with which designers are concerned.

Cheapest—Generally, a gray iron casting will cost less if it will do the job. A design modification may allow its use. But where ductility or higher impact strength is needed, the designer will have to go to a more expensive material.

The machinability of gray iron is a cost saving feature. Excellent castability is another plus. It helps to maintain design flexibility.

Castability and machinability decrease as tensile strength increases. The overcautious engineer is wasting money when he specifies a


Mallory-Sharon Titanium Corp.
Pumpshaft made of pure titanium (MST Grade III) beats corrosion


Rem-Cru Titanium Inc.
Contact parts of filter press are made from commercially pure metal to handle corrosive slurries of calcium hypochlorite

higher tensile strength iron than he needs.

Ductile Iron—This cast ferrous material has the processing advantages of gray iron (good fluidity, castabiilty, ready machinability, and low melting point) and many of the engineering advantages of steel (good strength, toughness, wear resistance, and substantial ductility).

As mentioned, the chief factor which limits strength and ductility in gray iron is the presence of random graphite flakes. With the addition of a little magnesium, the graphite in nodular iron takes the form of small nodules or spheroids. They make a stronger, tougher, more ductile casting.

Applications for nodular iron have grown rapidly, and specifications have been drawn up to assist users in getting the proper grade for the job. Heat treatment is often used to bring out needed properties.

Jobs It Can Do—Where pressure tightness is needed, nodular iron casting can be used for such parts as pipes, and cylinder and compressor heads.

Where toughness is needed, it can be used for castings subject to moderate impact or shock, such as gears, pulleys, and transmission cases.

Where wear resistance is needed, it can be used for parts such as brakewheels, plow shares, and packing rings.

Malleable—The automotive industry uses about half the malleable iron castings produced. The other half goes to such diverse fields as railroad and agricultural equipment, machinery, electrical fittings and equipment, and ordnance.

Malleable iron has unique properties. At the top of the list are high toughness, ductility, and good resistance to atmospheric corrosion. Sound castings can be made in complicated forms over a wide range of weights and sizes because of the material's excellent machinability and good castability.

Standard and Pearlitic—Standard malleable accounts for the largest tonnage, but in the last few years pearlitic has shown remarkable growth. It is due to high strength and performance characteristics once associated with carbon steel castings or forgings.

The various grades of standard and pearlitic malleable iron provide a wide range of minimum ultimate tensile strengths and minimum yield strengths. They offer impressive ratings in a long list of physical and mechanical properties. High ratio of yield point to ultimate strength and ease of machining also interest designers.

Choice—The different grades of nodular iron and pearlitic malleable have a fairly comparable range of physical properties. One company has set forth this rule of thumb for selection: Nodular iron is usually more feasible in heaver section castings; in lighter castings (under ¾-in. wall section), malleable or pearlitic malleable is a better choice.

Steel Castings—Here is a product that is especially adapted to withstand complex stresses in shapes which are difficult to obtain by other methods. Once the function of a proposed design is established, the steel casting engineer can work with the designer toward acceptable, commercial, or specification quality in keeping with safety factors and weight or size limitations.

A recent method of determining design is to analyze the function of the part using strain gages or some other similar method. However, a large percentage of steel castings are produced for commercial items where design costs such as this cannot be justified.

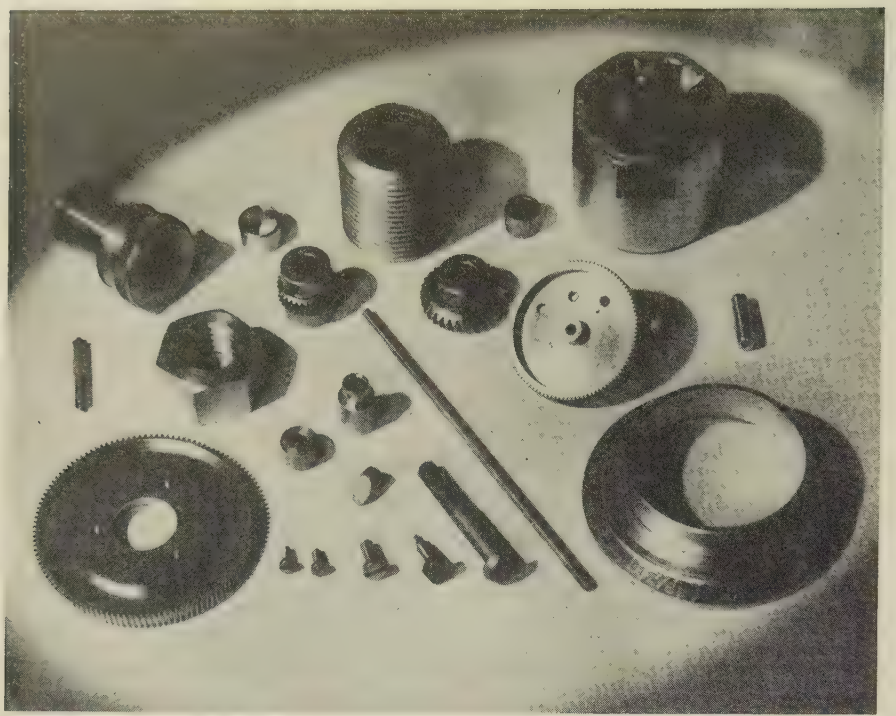
Specs—The Steel Founders' Society of America recommends the use of ASTM specifications. They cover mechanical properties, methods of testing, radiographic examination, and magnetic particle inspection.

Properties listed in specifications are generally exceeded when production heats are tested. The specification identifies the material needed for low safety factor design.

A wide variety of properties can be produced in steel and the same applies to steel castings. Commercial steel castings are available with strengths above 200,000 psi; some special compositions and treatments are being used to give strengths which approach the 300,000 psi range.

Upgrading — Established design which must be used in equipment subjected to heavier loads frequently can be upgraded by a steel casting. Often it's desirable to modify the design to benefit from the greater strength of cast steel and save weight.

Established design for a steel casting also can be upgraded by the use of alloys or heat treatment. For extreme temperature ap-



Copper & Brass Research Association

Copper Alloys Gain Special Properties—Phosphor bronze rod used for these screw machine parts contains lead to help machinability

plications, they are used at -300 to 1150° F.

Designers accept the fact that properly selected cast steels produced to high quality standards will perform well. The important thing for the user to keep in mind is to be sure that properties and design stresses required are identified.

Copper

The alloys listed in the wrought copper chart are standard in the sense that over a period of years they have been the ones most commonly ordered in large quantities by consumers. There also are many special and proprietary alloys which are produced for a number of uses.

Good machinability is offered by many copper base alloys. Other useful properties: Excellent corrosion resistance, high electrical and thermal conductivity, and low magnetic permeability.

They have a broad range of attractive colors, which includes the red of copper, the yellow of brass, and the silvery-white of nickel silver.

Mechanical Properties — The broad range available makes possible several tempers for applications requiring high strength and hardness, plus ductility. Some alloys have excellent hot and cold working properties.

Alloying elements are sometimes added to bring out properties. Aluminum added to brass improves its resistance to impingement corrosion from turbulent water or other fluids flowing at high velocity and increases its strength. The addition makes it a more useful material for condenser and heat exchanger tubes.

A small amount of silicon in aluminum bronze increases its strength, corrosion resistance, and machinability. It makes it better for forgings and extrusions where high tensile strength is needed.

Copper Casting Alloys — The ASTM classification is based on the range of principal elements. Brasses include a large number of alloys in which the chief element other than copper is zinc. They are used where an economical, moderately corrosion resistant metal is needed for pressure castings and general applications.

Bronzes—Tin is the chief alloying element—with or without zinc, lead, and nickel. In general, the strength and hardness of the material are better than those of the brasses, and they are used where structural strength and wear resistance as well as corrosion resistance are required.

Leaded bronzes and brasses are more easily machined than those without lead. Lead additions also enhance pressure tightness in the interdendritic tin bronzes. A tensile strength of 100,000 psi is possible.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, Ohio.*

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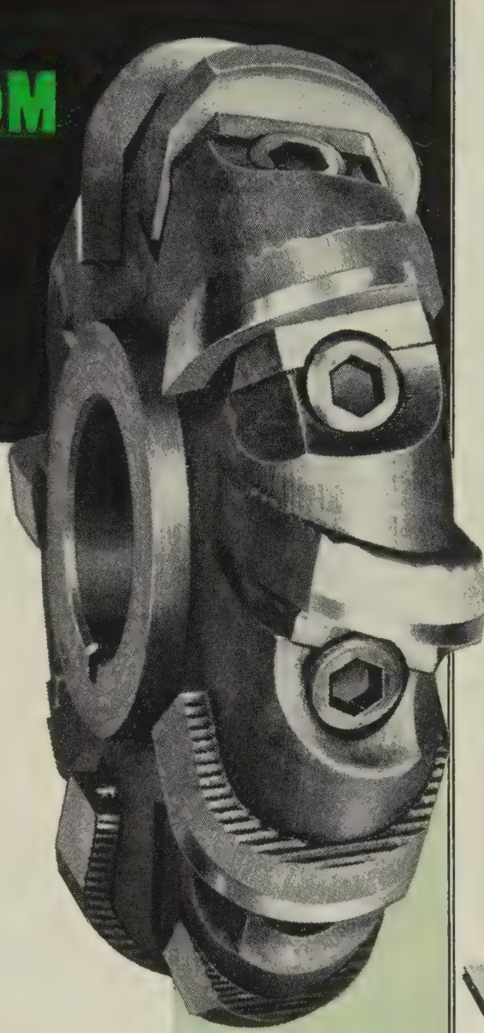

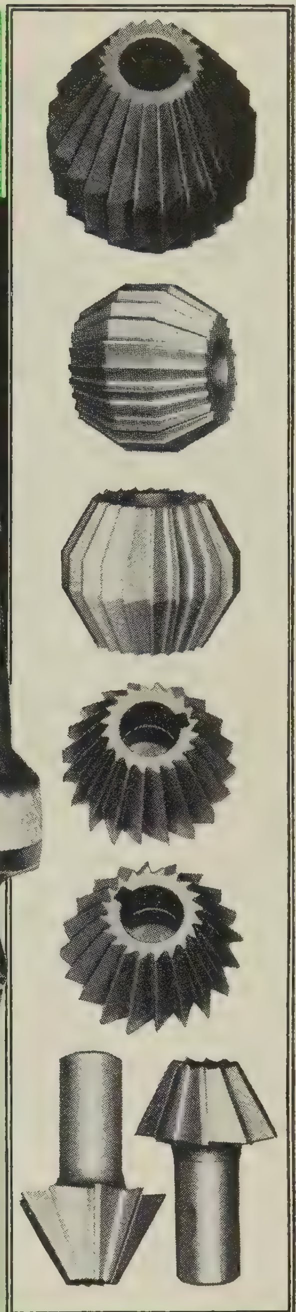

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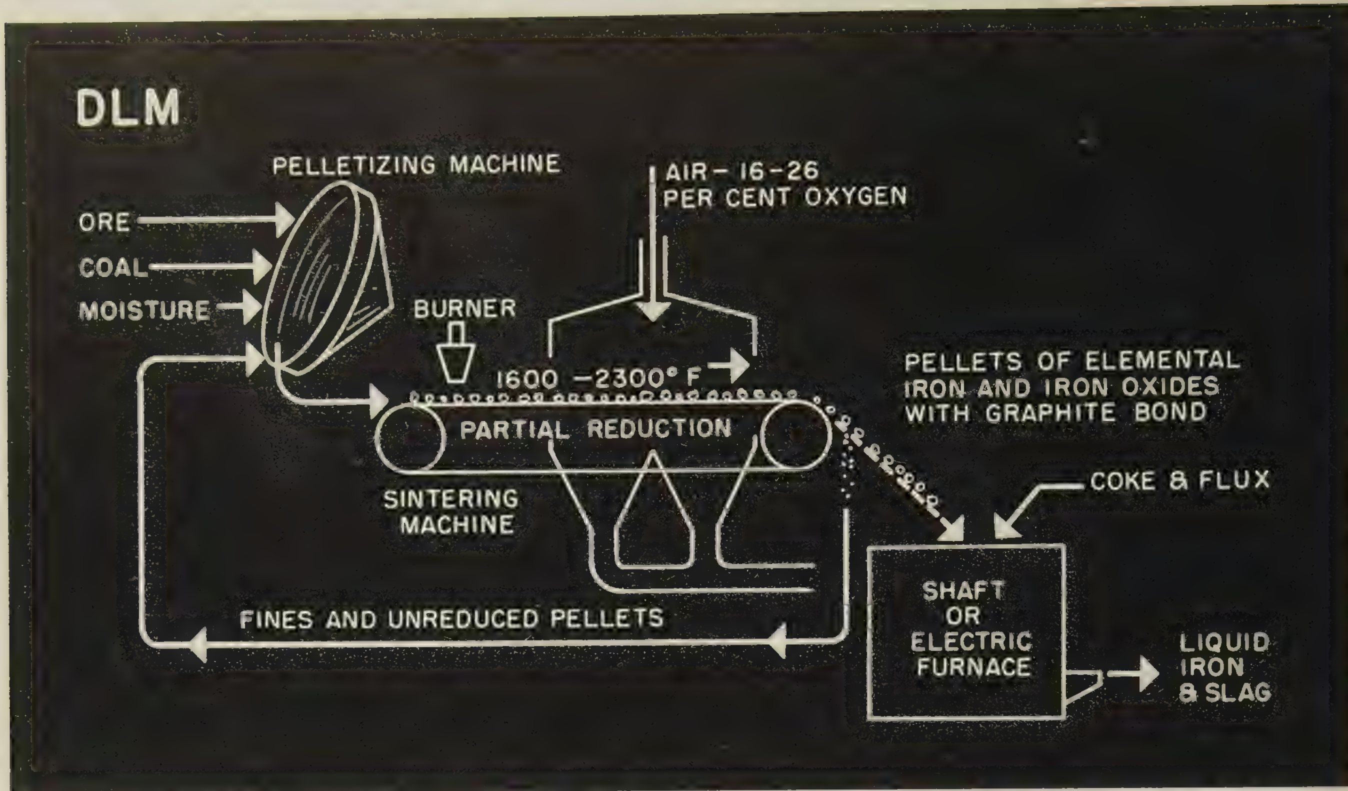
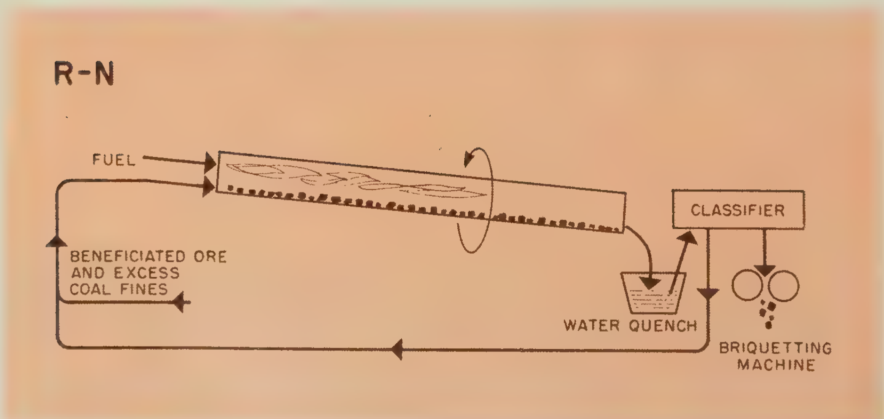


Dwight-Lloyd-McWane process is the latest to enter the direct reduction race. It's an adaptation of a pelletizing-sintering plant

The Case for Direct Reduction

Whether we like it or not, the blast furnace is pricing itself out of the market. Substitute processes offering lower installed costs are ready to move in



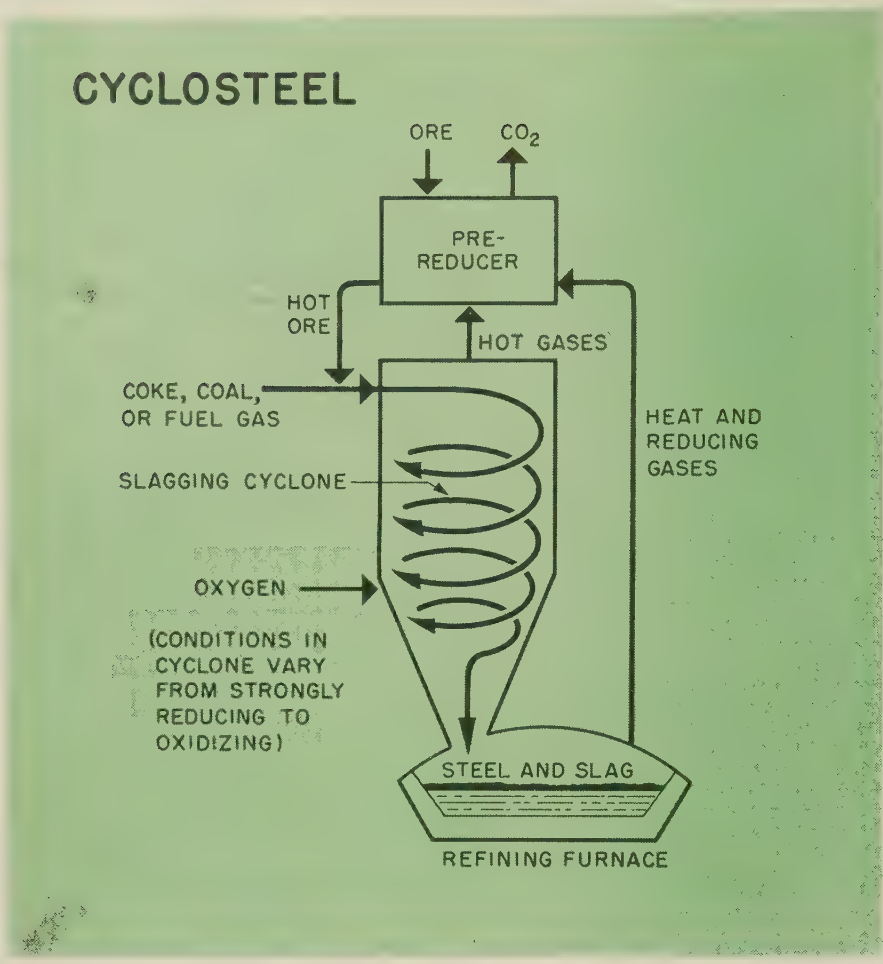
R-N process, well suited to Alabama ores, requires careful heat balance in the kiln to obtain reduction without sticking

A BRITISH writer recently estimated that American research on direct reduction of iron ore is costing $9 million to $12 million a year. Obviously, we are taking the subject seriously again, but why?

Only ten years ago it was a dead issue in the U. S. Steelmen remember vast wartime research that showed we could make iron by dozens of methods—if we were willing to ignore costs. They remember the monumental failures.

To find the answer to "why now?" you have to look at the growth picture. The stock arguments aren't strong enough:

1. Coking coal: Supplies of high quality metallurgical coking coal have been declining steadily, making processes that use lower grade fuel of great importance. (But we're learning how to stretch our



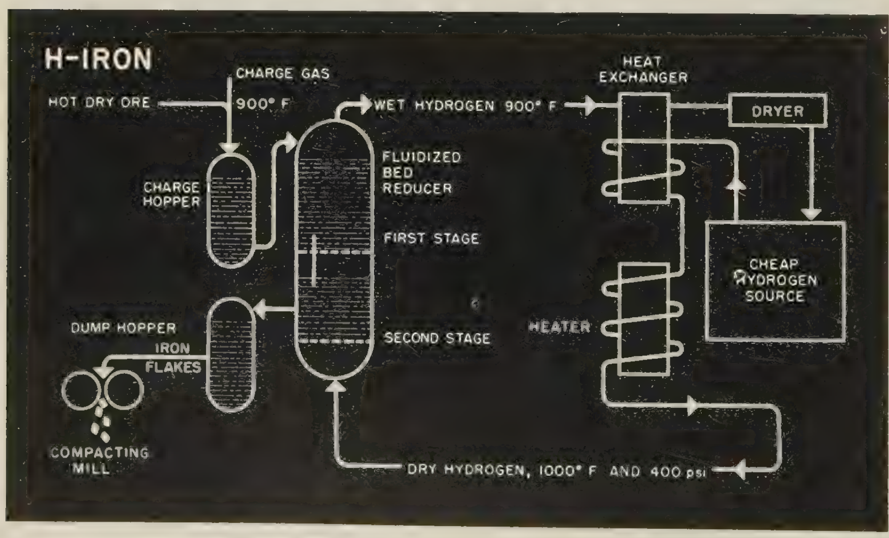
Cyclosteel process theoretically combines reducing-oxidizing reactions to jump from ore directly to steel

coking coal by blending and coal washing.)

2. Iron ore: Supplies of high iron content ore are getting scarce, making beneficiation necessary. (But most direct reduction proposals also require some form of beneficiation and ore sizing.)

3. Scrap: The continued high price of scrap adds attractiveness to any process which will produce an artificial scrap at a lower figure. (But can a scrapmaking process that stands idle when scrap prices fall be justified?)

4. Efficiency: Direct reduction is theoretically more efficient than the blast furnace. (But in practice few schemes have ever approached the efficiency of the blast furnace. None has approached its output).



H-iron process will get a \$3.6 million chance to prove itself by making iron powder for Alan Wood Steel Co.

Expansion—Such arguments will carry more weight as our mineral poverty gets worse. Present interest in direct reduction can only be explained in terms of futures.

If we are to reach our predicted 185 million tons of ingot capacity in 1970, our blast furnace capacity will have to be increased to about 120 million tons—it now stands at 87 million. We are going to have to come up with 33 million more tons of iron a year. Granting that some will come from the improvement of ironmaking facilities, we will still need 65 new blast furnaces (or equivalent) in 13 years.

Money—Plain and simply, we aren't going to make all this iron by the blast furnace route. A new blast furnace with auxiliaries costs close to \$50 million and will cost more tomorrow. Under present conditions (inflation, unrealistic depreciation, and high taxes), we are going to be forced to build some ironmaking facilities whose installed costs per ton of iron are less than those of the blast furnace—even if operating costs turn out to be higher.

Where and When—Since direct reduction is definitely coming, it seems reasonable to ask how soon and where? The first big installation needs a ready source of iron ore (near a mine or seaport); low cost fuel (soft coal, natural gas, byproduct hydrogen, electric power); and a market for hot metal or scrap that is overreaching the supply. The Gulf Coast, southern California, and the far Northwest have been pointed out as fitting these requirements.

Every major steel company has a pilot plant in operation, or a process in the "serious consideration" stage. At the moment, the R-N process (Republic Steel Corp.-National Lead Co.) probably comes closest to being a production operation. (See box score on Page 185.)

Rotary Kiln — At Republic's Spaulding mine, near Birmingham, a long rotary kiln capable of treating 175 tons of ore a day has been in operation for the last two years. It is charged with a high grade ore

(*Please turn to Page* 185)

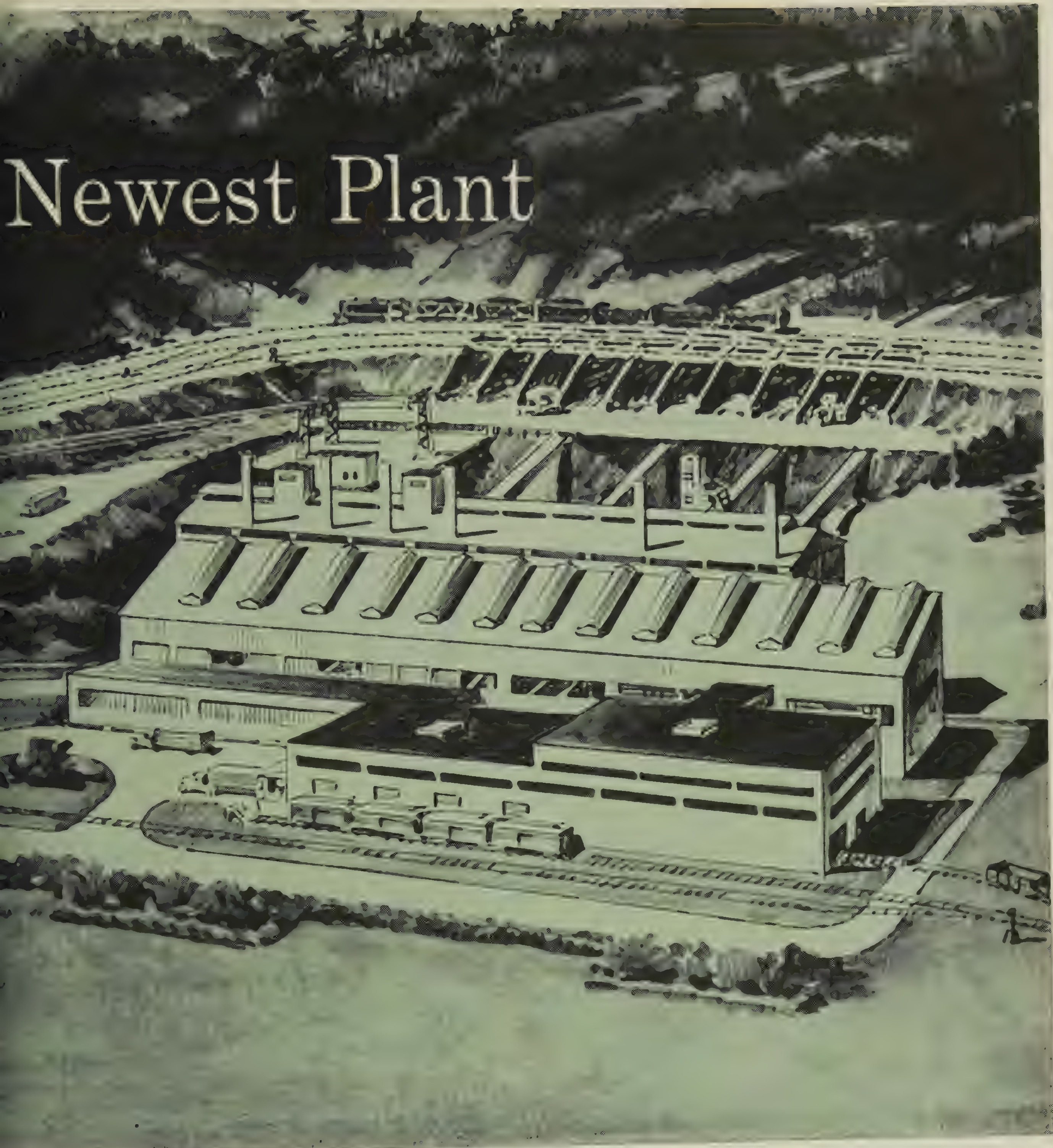
Box Score on Direct Reduction

(*Continued from Page* 182)

Process	Its Nature	Location	Reducing Agent	Type Product	Status	Remarks
Tysland-Hole	Electric arc furnace	Several in Scandinavia	Low grade coal with arc heat source	Pig iron	Production	Requires cheap electric power. Siemens furnace is similar.
Lubatti	Electric resistance furnace	Forni Lubatti Co., Turin, Italy	Coal	Pig iron	Production (?)	Fine ore reduced by coal fines in slag maintained molten by resistance heating.
Krupp-Renn (Johannsen)	Rotary kiln	Several in Europe, Asia, Africa	Low grade coal, or coke breeze	Iron nodules, sponge iron	Production	Product likely to be high in sulfur, silica, gangue. Basset kiln is similar.
R-N (Republic Steel-National Lead)	Rotary kiln	Birmingham	Low grade carbon fuel	Iron flake compacts	Semi-production	Employs a highly beneficiated charge.
Madaras	Fluidized bed	Longview, Tex.	Cracked natural gas	Sponge iron	Semi-production	A modified Madaras plant is making charge metal for a small Mexican steel company.
Nu-Iron (U. S. Steel)	Fluidized bed	South Works, Chicago	Hydrogen & carbon monoxide	Iron powder compacts	Pilot	Continuous process using natural gas source for reducing gases.
Esso-Little (Arthur D. Little)	Fluidized bed	Arthur D. Little Inc., Cambridge, Mass.	Hydrogen & carbon monoxide	Iron powder compacts	Pilot	Continuous process using natural gas source for reducing gases.
H-Iron (Hydrocarbon Research)	Fluidized bed	Hydrocarbon Research Inc., Trenton, N. J.	Hydrogen	Iron powder compacts	Semi-production	Alan Wood Steel Co. has ordered full scale plant.
Hoganas (Sieurin)	Tunnel kiln	Hoganas, Sweden; Riverton, N. J.	Coke or coal	Sponge iron	Production	Used mainly for iron powder production.
Domnarfvet	Rotary furnace	Domnarfvet, Sweden	Coke or coal	Sponge iron	Experimental	Operating problems similar to Krupp-Renn.
Diamond Alkali	Rotating drum	Battelle Memorial Institute, Columbus, Ohio	Coal	Liquid iron or steel	Experimental	Applications to direct reduction still theoretical.
Demag-Humbolt	Low shaft blast furnace	Germany	Coal	Pig iron	Production	One of many low shaft designs. Not competitive with coke blast furnace.
DLM (Dwight-Lloyd-McWane)	Sintering machine & shaft furnace	McDowell Co. Inc., Cleveland	Cheap coal or coke breeze	Pig iron	Experimental	Primarily a pellet roasting process.
Cyclosteel	Slagging cyclone with fluidized bed preheater	British Iron & Steel Research Assn., London	Cheap coal or natural gas & oxygen	Steel	Experimental	Several stage reduction with liquid end product.

(*Please turn to Page* 187)

Newest Plant



This is Vancoram, Ohio. Here, on a 300-acre Jefferson County site, VCA produces chromium and silicon alloys essential to stainless steel production.

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concentrate mixed with a carbon char derived from low grade, noncoking coal or coke breeze. The carbon charge is several times that theoretically required to reduce the ore.

The kiln is fired with an oxidizing flame, but with the excess carbon, reducing conditions in the charge are sufficient to produce 90 per cent reduction. The end product, highly saturated with carbon, is quenched in water and crushed. The uncombined carbon is returned to the kiln, and the metallic iron is separated from the gangue (probably by wet classification and magnetic separation) and then is put through a briquetting press.

Artificial Scrap—Republic says the R-N briquets have an iron content of 85 to 95 per cent and a silica content frequently under 1 per cent. High silica has been one of the objections to kiln reduction. By separating out most of the silica before putting the charge in the kiln, Republic probably gets away from a lot of the sticking and ring formation that have plagued kiln operators. About 90 per cent of the sulfur and phosphorus in the ore is rejected, too.

The briquets, in sizes up to 25 lb, can be used as the equivalent of No. 1 heavy scrap in open hearth and electric furnaces. A grade of lower iron content for blast furnace charging is also separated from the end product and is made up into peach-seed briquets.

Long kilns are not the only kind that bear watching. (They have a long and checkered history, in which the numerous Krupp-Renn installations play the leading part.) Since the war, the Swedes have been trying stubbier rotating vessels with some success. Don't overlook the Diamond Alkali Reactor (STEEL, July 1, p. 74) as another possibility.

Electric Arc — Although used successfully in Scandinavia and other cheap power areas, the electric smelting furnace has never had much of a chance in this country. Tied in with ore beneficiation and partial reduction processes, it could make a breakthrough. Several processes can provide a partially reduced feed for an electric smelter, which can then accomplish the final refinement to molten pig

(or even steel) at a reasonable energy expenditure.

Certainly, electric smelting will have an inside track when cheap atomic power becomes available. In fact, any process which can make good use of conventional equipment is a big step ahead.

One that appears to fit this requirement is the Dwight - Lloyd-McWane process (McDowell Co. Inc., Cleveland). It would use a pelletizing machine and a sintering plant. both quite conventional.

Pellet Reduction—Pellets for the DLM process are formed from iron oxide and coal fines in excess of the carbon needed for reduction. They are spread on a sintering strand and ignited. Air is drawn through the bed of pellets and the blast continued until about 6 per cent carbon by weight remains in the charge. At this point the oxides are perhaps 40 per cent reduced, and the carbon undergoes a transformation to graphite which binds the pellet materials together.

The partially reduced pellets are charged to a smelting furnace (the original idea seems to have been a shaft furnace, but an electric smelter would probably do as well). Coke and flux stone are added as needed to complete the reduction to molten pig suitable for open hearth charging.

Shaft Furnaces — The low and medium shaft smelting furnaces all bear a kinship to the blast furnace; they get away from the cost of coke ovens by using low-grade, carbonaceous fuel. Being of low crushing strength, such a charge makes a high shaft impossible.

The feeling seems to be that our fuel situation is not bad enough to make the low shaft blast furnace of any use in the American economy. There are plenty of working examples to rely on (including an international test furnace at Liege, Belgium) if they are ever to make an appearance here.

Fluidized Bed—Taking their cue from the catalytic crackers of the oil industry, several companies are working with fluidized bed plants. Powdered ore is reacted with a reducing gas in a closed vessel under conditions which cause the ore particles to act like a fluid. A maximum amount of their surface is

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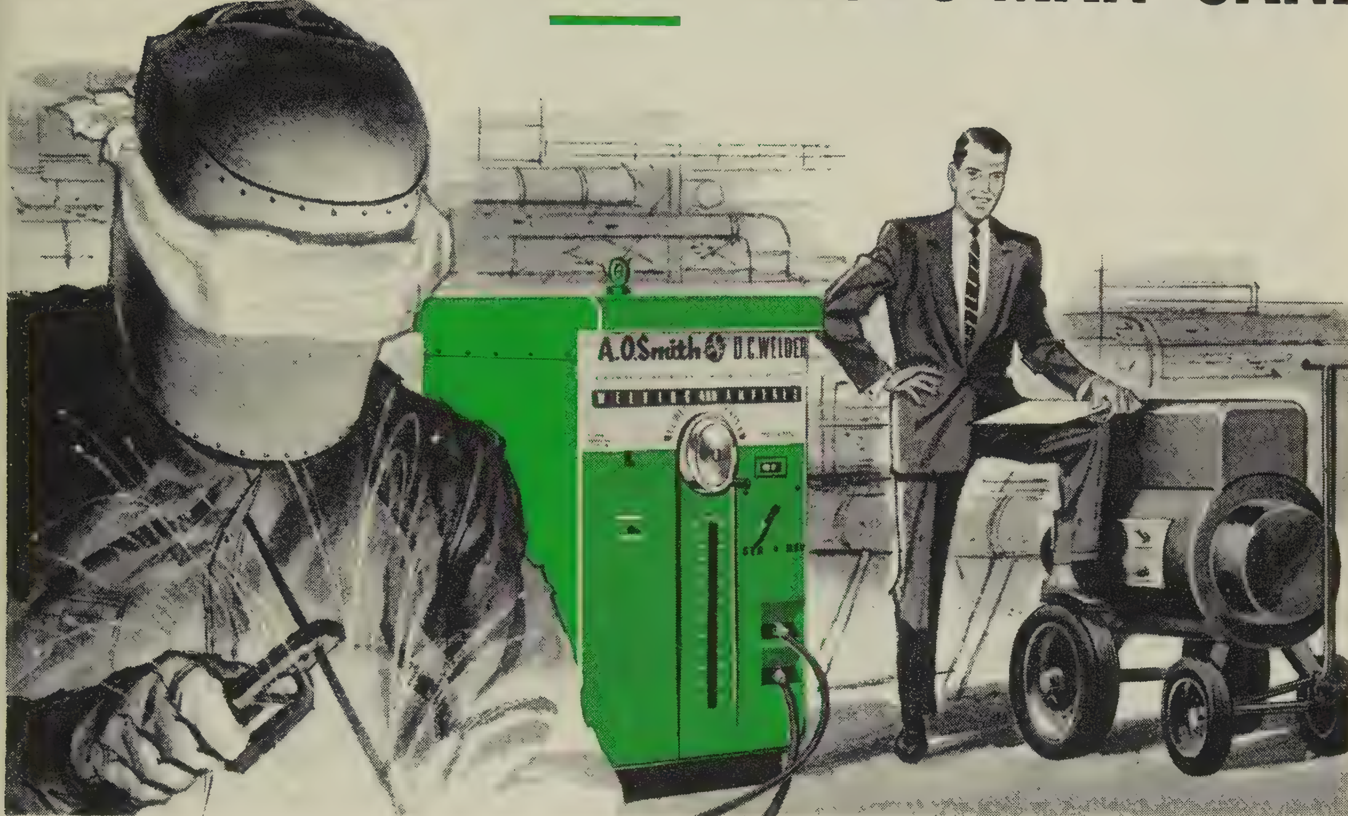

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exposed to reducing gas, and the particles can be made to flow from one vessel to another, making the processes theoretically continuous.

Best publicized is the H-iron process (Hydrocarbon Research Inc. and Bethlehem Steel Co.) which uses pure hydrogen at 900° F and 400 psi as the reducing agent. The Nu-Iron process (U. S. Steel Corp.) is said to reduce with a combination of hydrogen and carbon monoxide at about 1300° F and 50 psi. The Esso-Little process (Arthur D. Little Inc.) operates with a mixture of hydrogen, carbon monoxide, and nitrogen at atmospheric pressure and 1600° F.

Each depends on cheap hydrogen or cheap natural gas for its reducing atmosphere and produces a synthetic scrap. We can assume that some of the problems that plagued earlier fluid bed processes have been solved, such as sticking in the vessel and a pyrophoric end product. H-iron ought to be about ready for a full scale trial. It has already created so much interest that the name may become generic.

Phenomenon — The Cyclosteel process (British Iron & Steel Research Assn.) is another good example of the emotional appeal of direct reduction. It has attracted international attention on the basis of almost no facts. Perhaps what intrigues people is the report that it can take in ore at one end and turn out steel at the other.

The same claim has been made for other processes.

Summing Up — What is much more surprising is that so many people seem bent on ignoring the economic facts. These processes will have to provide hundreds of tons of iron or steel on a trouble-free, round the clock basis. They will have to compete with that established, versatile workhorse, the blast furnace (and it isn't going to stand still). They will have to do it for a cheaper installed cost and eventually for a cheaper operating cost.

Until that time arrives, theory can go stand in the corner.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, Ohio.*

Future of Iron and Steelmaking — Sven G. E. Fornander, Surahammars Bruks A. B., Sweden.

Future of Nonferrous Metallurgy—Francis C. Frary, Aluminum Co. of America.

Future Fabrication Techniques — Manuel C. Sanz, North American Aviation Inc.

Future of Heat Treatment — Otto Schaaber, Bremen, St. Magnus, Germany.

Role of the Metal Engineer in Nuclear Power—R. A. Skinner, A.E.I.—John Thompson Nuclear Energy Co. Ltd., England.

Summary — Zay Jeffries, Director General, 2nd World Metallurgical Congress.

TECHNICAL PAPERS

Monday, Nov. 4—9 a.m.

STEEL I

Ballroom, Palmer House

Presiding Officers—D. J. Carney, U. S. Steel Corp., Morris Cohen, Massachusetts Institute of Technology.

Electrolytic Extraction of Carbides from Carbon Steel—R. W. Gurry, Quaker Chemical Co., J. Christakos, W. M. Kellogg Co.; C. D. Stricker, American Steel & Wire Div., U. S. Steel Corp.

Transformation Structures in Hypoeutectoid Alloy Steels—W. C. Hagel and M. N. Ruoff, General Electric Co.

Effect of Manganese on the Curie Point of Cementite—Prof. Earl C. Roberts, University of Washington.

Morphological and Phase Changes During Quench-Aging of Ferrite Containing Carbon and Nitrogen—G. Lagerberg, Stora Kopparbergs Bergslags Aktiebolag, Domnarvet, Sweden; B. S. Lement, Massachusetts Institute of Technology.

Some Relationship Between Torsional Strength and Electron Microstructure in a High Carbon Steel—S. T. Ross, R. P. Sernka, and Walter E. Jominy, Chrysler Corp.

ZIRCONIUM

Red Lacquer Room, Palmer House

Presiding Officers—J. H. Bechtold, Westinghouse Electric Corp.; J. L. Wyatt, Horizons Inc.

Powder Metallurgy of Zirconium-Uranium Alloys—Herbert S. Kalish, Sylvania Electric Products Inc.

A Hot-Hardness Survey of the Zirconium-Uranium System — W. Chubb, Battelle Memorial Institute; G. T. Muehlenkamp, General Electric Co.; A. D. Schwope, Clevite Research Center.

Transformation Kinetics of Zirconium-Uranium Alloys—D. L. Douglass, L. L. March, G. K. Manning, Battelle Memorial Institute.

Transformation Kinetics and Mechanical Properties of Zr-Ti and Zr-Sn Alloys—R. F. Domagala, D. W. Levinson, and D. J. McPherson, Armour Research Foundation of Illinois Institute of Technology.

Monday, Nov. 4—2 p.m.

STEEL II

Ballroom, Palmer House

Presiding Officers—G. H. Enzian, Jones & Laughlin Steel Corp.; R. A. Grange, U. S. Steel Corp.

Some Aspects of the Morphology and Chemistry of Lead in Leaded High Sulfur Steels—J. W. Thurman and E. J. Paliwoda, Jones & Laughlin Steel Corp.; E. J. Duwell, Minnesota Mining & Mfg. Co.

Distribution of Residual Stresses in Carburized Cases and Their Origin—D. P. Koistinen, General Motors Corp.

Effect of Per Cent Tempered Martensite on Endurance Limit—F. Borik, R. D. Chapman, and W. E. Jominy, Chrysler Corp.

The Machinability of Type A Leaded Steels—E. J. Paliwoda, Jones & Laughlin Steel Corp.

TITANIUM

Red Lacquer Room, Palmer House

Presiding Officers—G. W. Birdsall, Reynolds Metals Co.; E. M. Mahla, E. I. du Pont de Nemours & Co.

Grain Growth and Recrystallization Studies on Commercial Titanium, RC-55, and Alloy, Ti-100A—Prof. E. L. Bartholomew, University of Connecticut.

Mechanical Properties and Heat Treatment of Titanium-Niobium Alloys—L. W. Berger, D. N. Williams, and R. I. Jaffee, Battelle Memorial Institute.

Evaluation of a New Titanium-Base Sheet Alloy, Ti-4Al-3Mo-1V—R. S. Richards, D. L. Day, and H. D. Kessler, Titanium Metals Corp. of America.

Mechanical Properties Correlated with Transformation Characteristics of Titanium-Vanadium Alloys—E. L. Harmon, A. R. Troiano, Case Institute of Technology; J. Kozol, Combustion Engineering Inc.

Factors Affecting the Absorption and Distribution of Hydrogen in Titanium During Acid Pickling—C. R. McKinsey, M. Stern, and R. A. Perkins, Electro Metallurgical Co.

The Mode of Hydride Precipitation in Alpha Titanium and Alpha Titanium Alloys—Tien-Shih Liu, Titanium Metals Corp.; M. A. Steinberg, Horizons Inc.

Tuesday, Nov. 5—9 a.m.

MECHANICAL PROPERTIES OF STEEL

Crystal Room, Palmer House

Presiding Officers—D. J. Girardi, Timken Roller Bearing Co.; W. T. Lankford, U. S. Steel Corp.

Strain Hardening of Austenitic Stainless Steel—G. W. Powell, Nuclear Metals Inc.; Prof. E. R. Marshall, University of Vermont; and W. A. Backofen, Massachusetts Institute of Technology.

The Effect of Rate of Stress Application and Temperature on the Upper Yield Stress of Annealed Mild Steel—J. A. Hendrickson and Prof. D. S. Wood, California Institute of Technology.

Some Aspects of Preyield Phenomena in Mild Steel at Low Temperatures—W. S. Owen, Morris Cohen, and B. L. Averbach, Massachusetts Institute of Technology.

The Energy Stored in Ingot Iron Deformed by Torsion at 25° C, −82° C, and −185° C—T. P. Wang, Wilbur B. Driver Co.; Prof. Norman Brown, University of Pennslvania.

METALLOGRAPHY

Ballroom, Palmer House

Presiding Officers—J. F. Libsch, Lehigh University; W. A. Reich, General Electric Co.

Classification of Precipitation Systems—R. O. Williams, Cincinnati Milling Machine Co.

A Method for the Etching of Metals by Gas Ion Bombardment—John B. Newkirk and W. G. Martin, General Electric Research Laboratory.

The Relation Between Constitution and Ultimate Grain Size in Aluminum—1.25 per cent Manganese Alloy 3003—Philip R. Sperry, Kaiser Aluminum & Chemical Corp.

The Occurrence of Laves-Type Phases Among Transition Elements—R. P. Elliott and W. Rostoker, Armour Research Foundation of Illinois Institute of Technology.

Tuesday, Nov. 5—2 p.m.

BRITTLE FRACTURE

Red Lacquer Room, Palmer House

Presiding Officers—J. E. Dorn, University of California, Richard Vanderbeck, U. S. Steel Corp.

Brittle Fracture of Mild Steel in Tension at −196° C—W. S. Owen, Morris Cohen, and B. L. Averbach, Massachusetts Institute of Technology.

The Initiation of Brittle Fracture in Mild Steel—J. A. Hendrickson, Prof. D. S. Wood, and D. S. Clark, California Institute of Technology.

A Study of the Role of Carbon in Temper Embrittlement—E. B. Mikus, General Motors Research Staff, and Prof. C. A. Siebert, University of Michigan.

Brittle to Ductile Transition Temperatures of Binary Chromium Base Alloys—E. P. Abrahamson II, and Prof. N. J. Grant, Massachusetts Institute of Technology.

Wednesday, Nov. 6—10 a.m.

Palmer House

Campbell Memorial Lecture—Modern Concepts of Flow & Fracture—E. R. Parker, University of Calif.

Wednesday, Nov. 6—2 p.m.

STAINLESS STEEL

Red Lacquer Room, Palmer House

Presiding Officers—G. A. Fritzlen, Haynes Stellite Co., P. G. Nelson, Budd Co.

Effect of Microstructure and Heat Treatment on the Mechanical Properties of AISI Type 431 Stainless Steel—G. E. Dieter, E. I. du Pont de Nemours & Co.

Effect of Aging Cycle on the Properties of an Iron Base Alloy Hardened with Titanium—T. W. Eichelberger, Westinghouse Electric Corp.

Influence of Nickel on Intergranular Corrosion of 18 per cent Chromium Steels—J. R. Upp, Wright Air Development Center, Wright-Patterson Air Force Base, and Profs. F. H. Beck and M. G. Fontana, Ohio State University.

Phase Relationships in Austenitic Cr-Mn-C-N Stainless Steels—C. M. Hsiao and E. J. Dulis, Crucible Steel Co. of America.

Carbide Precipitation and Brittleness in Austenitic Stainless Steel—A. Kramer and Prof. W. M. Baldwin Jr., Case Institute of Technology.

Thursday, Nov. 7—9 a.m.

MECHANICAL PROPERTIES

Red Lacquer Room, Palmer House

Presiding Officers—R. W. Guard, General Electric Co.; H. Y. Hunsicker, Aluminum Co. of America.

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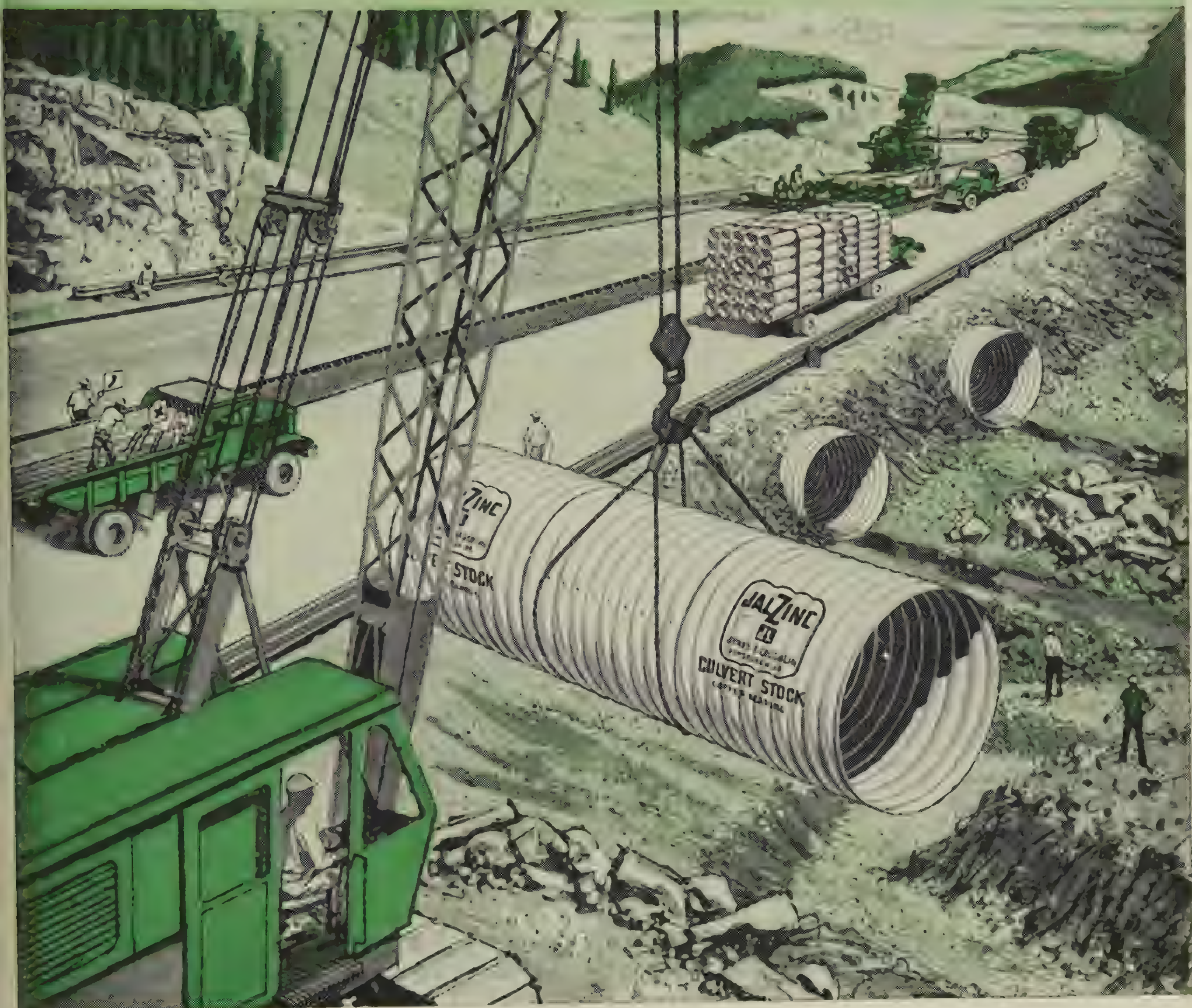

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ASM PROGRAM . . .

Effects of Temperature-Time Histories on the Tensile Properties of Airframe Structural Aluminum Alloys—R. E. Fortney and C. H. Avery, Northrop Aircraft.
Apparatus for Determining the Hardness of Metals at Temperatures up to 3000° F—M. Semchyshen and C. S. Torgerson, Climax Molybdenum Co. of Michigan.
The Mechanical Properties of Forged Chromium—S. A. Spachner and W. Rostoker, Armour Research Foundation of Illinois Institute of Technology.
Deformation and Fracture of Alpha Solid Solutions of Lithium in Magnesium—F. E. Hauser, P. R. Landon, and Prof. John E. Dorn, University of California.

THERMAL CYCLING OF URANIUM
Ballroom, Palmer House

Presiding Officers—H. H. Chiswik, Argonne National Laboratory; W. D. Manly, Oak Ridge National Laboratory.
Some Properties of Uranium-Low Titanium Alloys—Prof. Daniel J. Murphy, University of Arizona.
Effects of Fabrication and Heat Treatment Variables Upon the Thermal Cycling Behavior of Uranium—S. T. Zegler, R. M. Mayfield, and M. H. Mueller, Argonne National Laboratory.
Effects of Cycling Variables Upon Growth Rate of 300° C Rolled Uranium—R. M. Mayfield, Argonne National Laboratory.
The Growth of Uranium Upon Thermal Cycling—J. E. Burke and A. M. Turkalo, General Electric Co.
Microstructural Changes of Uranium Upon Thermal Cycling—L. T. Lloyd and R. M. Mayfield, Argonne National Laboratory.

JOINT SESSION, POWDER METALLURGY
Palmer House

Thursday, Nov. 7—2 p.m.
PHYSICAL METALLURGY

Red Lacquer Room, Palmer House
Presiding Officers—R. F. Hehemann, Case Institute of Technology; R. I. Jaffee, Battelle Memorial Institute.
Grain Boundary Movement in Bicrystalline Aluminum—Prof. R. B. Pond and E. Harrison, Johns Hopkins University.
Growth of Cadmium from the Vapor—J. E. McNutt, E. I. du Pont de Nemours & Co.; R. F. Mehl, Carnegie Institute of Technology.
Grain Boundary Self-Diffusion of Nickel—Prof. W. R. Upthegrove, University of Oklahoma; M. J. Sinnott, University of Michigan.
The Effects of Oxide Recrystallization on the Oxidation Kinetics of a 62:38 Copper-Nickel Alloy—J. A. Sartell, S. Bendel, T. L. Johnston, and C. H. Li, Minneapolis-Honeywell Research Center.
Temperature Stresses in the Two-Phase Alloy, WC-Co—Prof. J. Gurland, Brown University.

INTERNATIONAL PANEL DISCUSSIONS

(2nd World Metallurgical Conference)
All at Hotel Sherman

Monday, Nov. 4—9 a.m.
CARBURIZING
Louis XVI Room

Moderator—Walter Holcroft, Holcroft & Co.

SHIP WELDING
Crystal Room

Moderator—D. P. Brown, president, American Bureau of Shipping.

Monday, Nov. 4—2 p.m.
ELECTRODES
Crystal Room

Moderator—D. C. Smith, Harnischfeger Corp.

MINIMIZING DISTORTION
Louis XVI Room

Moderator—H. N. Bosworth, H. M. Bosworth Steel Treating Co.

Tuesday, Nov. 5—9 a.m.
STEEL GEARS
Crystal Room

Moderator—M. F. Garwood, Chrysler Corp.
Selection of Steel for Gears.
Fabrication of Gears.
Operation (Testing, proper mounting, stresses, etc.)

Tuesday, Nov. 5—2 p.m.
SELECTION OF SHEET STEEL for FORMABILITY
Crystal Room

Moderator—R. W. E. Leiter, Budd Co.

STRESS RELIEVING and PREHEATING (Welding)
Louis XVI Room

Moderator—Leon Bibber, U. S. Steel Corp.

Wednesday, Nov. 6—2 p.m.
CONTINUOUS CASTING
Louis XVI Room

Moderator—Carl E. Swartz, Consultant.

MACHINING OF STEEL
Crystal Room

Approach to the Problem of Machinability—M. E. Merchant, Cincinnati Milling Machine Co., Cincinnati.
Microstructure as Related to Machinability of Common Constructional Steels—Arthur H. Smith, Cadillac Motor Div., General Motors Corp., Detroit.
Effect of Composition of Constructional Steel on Machinability—L. W. Derry, Battersea Polytechnic, London, England.
Effect of Composition of Constructional Steel on Machinability—G. R. Caskey, Bliss & Laughlin Inc., Harvey, Ill.

Thursday, Nov. 7—9 a.m.
STEELMAKING AND REFINING

IRON
Bal Tabarin Room

Moderator—R. L. Stephenson, U. S. Steel Corp.
Present Technology of Ironmaking.
Developments in Ironmaking.
Direct Reduction of Iron.

PRACTICAL ASPECTS of METAL DEGASSING
Assembly Room

Moderator—Albert J. Phillips, American Smelting & Refining Co.

EDUCATION AND RESEARCH
George Bernard Shaw Room

Physical Metallurgy — Tokuschichi Mishima, Tokyo, Japan, and Thomas A. Read, University of Illinois.
Process Metallurgy—G. Letendre, Laval University, Quebec, P.Q., Canada, and W. O. Philbrook, Carnegie Institute of Technology, Pittsburgh.
Graduate Work—Earl R. Parker, University of California, Berkeley.
Industrial Training—Harry Smith, U. S. Steel Corp., Pittsburgh.

Thursday, Nov. 7—2 p.m.
STEELMAKING
Bal Tabarin Room

Moderator—Howard Jones, Jones & Laughlin Steel Corp.
Oxygen in Steelmaking—Sven G. E. Fornander, Surahammars Bruks AB, Sweden, and Harold B. Emerich, Jones & Laughlin Steel Corp., Pittsburgh.
Vacuum Melting—Otto Winkler, Balzers, Geraetebau-Anstalt, Furstentum, Idechtenstein, and James H. Moore, Metal Hydrides Inc., Beverly, Mass.
Vacuum Degassing—Fritz Harders, Dortmund-Horder Huttenunion AG, Dortmund, Germany, and E. C. Bain, U. S. Steel Corp., Pittsburgh.

TESTING in PRODUCT DEVELOPMENT
Crystal Room

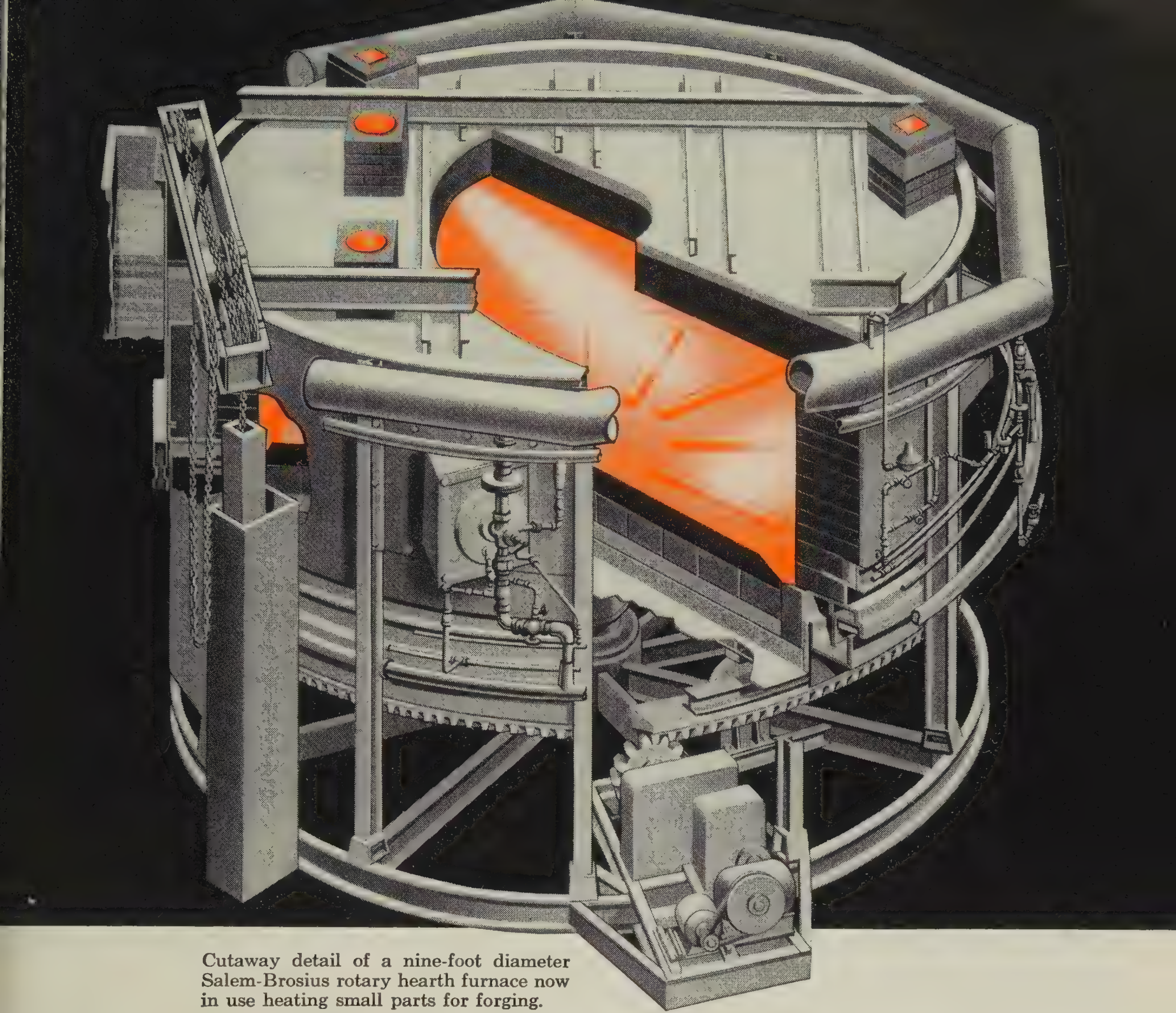
Co-Moderators—H. N. Bogart, Ford Motor Co., G. W. Stickley, Aluminum Co. of America.
Large Components—Low Volume Production
(Examples: Turbine shafts for power stations or marine engines).
Medium Size Components—Moderate Volume Production.
(Example: Aircraft components).
Medium and Small Components—Large Volume Production
(Example: Automotive components).

TRENDS in METALLURGICAL RESEARCH IN AMERICA
George Bernard Shaw Room

Moderator—Clyde L. Williams, Battelle Memorial Institute.
Industrial Research—Ivor Jenkins, Research Laboratories, General Electric Co., Ltd., Wembley, Middlesex, England, and E. C. Bain, U. S. Steel Corp., Pittsburgh.
Government and Government-Sponsored Research—N. P. Allen, Metallurgy Division, National Physical Laboratory, Teddington, Middlesex, England, and Julius Harwood, Office of Naval Research, Washington, D. C.
Institutes and Research Consultant Groups—E. A. G. Liddiard, Fulmer Research Institute, Stoke Poges, Bucks, England, and Bruce Old, Arthur D. Little Inc., Cambridge, Mass.
University Research—Hans Nowotny, Technische Hochschule, Vienna, Austria, and R. F. Mehl, Carnegie Institute of Technology, Pittsburgh.

Friday, Nov. 8—9 a.m.
SOLIDIFICATION of STEEL
Bal Tabarin Room

Moderator—C. W. Sherman, Latrobe Steel Co.
Ingot Technology.
Controlled Nucleation.
Continuous Casting.



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ASM PROGRAM . . .

TESTING for QUALITY CONTROL AFTER PRODUCT DEVELOPMENT

Room 101

Co-Moderators—R. F. Thomson, General Motors Corp.; T. E. Piper, Convair Div., General Dynamics Corp.

Quality Control on Semifinished Product.
- Wrought Materials.
- Cast Materials.

Quality Control on Component Manufacture.
- Automotive.
- Aircraft.

Monday, Nov. 4—9 a.m.

CONFERENCE ON PLUTONIUM

Session at Palmer House

General Chairman—Arthur S. Coffinberry, Los Alamos National Laboratory.

Plutonium—Historical Review; Present Activities, Prospects.
Co-Chairmen—Glenn T. Seaborg, Radiation Laboratory, Berkeley, Calif. and Cyril S. Smith, University of Chicago.

Monday, Nov. 4—2 p.m.

Role of Plutonium in Nuclear Power
Co-Chairmen—Walter H. Zinn, consultant, former head of Argonne National Laboratory; H. M. Finniston, U. K. Atomic Energy Authority, Harwell, England.

Tuesday, Nov. 5—9 a.m.

Physical Properties of Plutonium
Co-Chairmen—E. R. Jette, Union Carbide Corp.; Dr. John Chipman, Massachusetts Institute of Technology.

Tuesday, Nov. 5—2 p.m.

Plutonium Alloys and Fuel Elements
Co-Chairmen—A. S. Coffinberry, and O. J. C. Runnallis, Atomic Energy of Canada Ltd., Chalk River, Ont.

Wednesday, Nov. 6—9 a.m.

Welding of Stabilized 18-8 Stainless Steels

Wednesday, Nov. 6—2 p.m.

Welding in Nuclear Power Generators

Thursday, Nov. 7—9 a.m.

Advanced Metallographic Techniques

Thursday, Nov. 7—2 p.m.

Metallography of Nuclear Materials

1957 EDUCATIONAL LECTURE SERIES

Sessions in Room 14, Palmer House

Monday, Nov. 4—9:30 a.m.

Introductory, Summary Lectures—Precipitation From Solution—Dr. R. F. Mehl, Carnegie Institute of Technology.

10 a.m. — Theory and Mechanism — Dr. J. B. Newkirk, General Electric Co.

11:15 a.m.—Precipitation in Copper Alloys—Dr. William D. Robertson, Yale University, and Robert Bray.

2 p.m.—Precipitation Reactions in Irons and Low Alloy Steels—H. W. Paxton, Carnegie Institute of Technology.

3 p.m.—Precipitation in Iron Base Alloys—Dr. Adolph J. Lena, Allegheny Ludlum Steel Corp.

Tuesday, Nov. 5—9:30 a.m.

Precipitation Hardening Aluminum Base Alloys—Dr. W. A. Anderson, Aluminum Co. of America.

10:30 a.m.—Precipitation Reactions in Magnesium Alloys—Dr. R. S. Busk, Dow Chemical Co.

2 p.m.—Some Age-Hardening Characteristics of Nickel-Rich, Nickel-Chromium and Nickel-Chromium-Iron Alloys Containing Titanium and Aluminum—Dr. R. J. Raudebaugh and Clarence Bieber, International Nickel Co.

3 p.m.—Precipitation in Cobalt Base Alloys—Glenn A. Fritzlen, Haynes Stellite Co.

Special Libraries Association Metals Division

Knickerbocker Hotel

Wednesday, Nov. 6—9:30 a.m.

PROGRESS IN NONFERROUS METALLURGY

Armour Research Foundation (Limited to Metals Division Members), Commons Lounge, 3200 S. Wabash.

Welcome, O. T. Barnett, Metals Research Dept.

Recent Development in Nonferrous Metallurgy—Dr. D. W. Levinson, Metals Research Dept.

ASM PROGRAM . . .

The Report and Document Library at Armour Research Foundation — Mary Patricia Murray, Report and Document Librarian.

Design of a Punch Card System as an Example of Literature Research at Armour Research Foundation—Ann P. Wennerberg, Literature Research Section.

Thursday, Nov. 7—9:30 a.m.

PROGRESS IN FERROUS METALLURGY

International Harvester Co., Central School, 190 E. Delaware Place.

Presiding—J. J. Beinlich, U. S. Steel Corp.

Recent Advances in Ferrous Research—Dr. R. H. Aborn, U. S. Steel Corp.

Metallurgy and Physics—Dr. D. S. Lieberman, University of Illinois.

Developments in High Temperature Alloys—M. C. Metzger, Universal Cyclops Steel Corp.

Friday, Nov. 8—9:30 a.m.

INTERNATIONAL ASPECTS OF LITERATURE RESEARCH

International Harvester Co., Central School, 190 E. Delaware Place.

Presiding—Marjorie R. Hyslop, Managing Editor, *Metal Progress*.

The Technical Library and Information Services for the British Metallurgical Industries—Anthony Post, The Iron and Steel Institute, London, England.

Activities and Functions of the Centre de Documentation Siderurique — Dr. Marc Allard, Institute de Recherches de la Siderurgie and Max Dupont, Centre de Documentation, Siderurique, St. Germain-en-Laye, France.

Bibliographic Services Within Aluminum-Industrie—Dr. Ernst A. Bloch, Aluminium-Industrie AG, Neuhausen am Rheinfall, Switzerland.

Importance of Documentation—Frank T. Sisco, Engineering Foundation, New York.

H. Luling, chief metallurgist of Georg Fischer Aktiengesellschaft, Schaffhausen, Switzerland, will describe the scope and function of the new library recently established by this European iron foundry.

Institute of Metals Division AIME

John C. Kinnear Jr., President

Monday, Nov. 4—9 a.m.

SEMINAR ON STRUCTURE OF SOLID SOLUTIONS

Constitution Room, Morrison Hotel

Elastic Constants of Solid Solutions—Charles S. Smith, Case Institute of Technology.

Resistance Anomalies in Dilute Alloys—R. W. Schmitt, General Electric Co.

Nuclear Magnetic Resonance in Metals and Alloys—T. J. Rowland, Electro Metallurgical Co.

DEFORMATION

Cotillion Room, Morrison Hotel

Effect of Deformation and Low Temperatures on the Structures of AgCd and AuZn—D. B. Masson and C. S. Barrett, University of Chicago.

Role of Rate-History in the Calculation of Creep Behavior—J. D. Lubahn, General Electric Co.

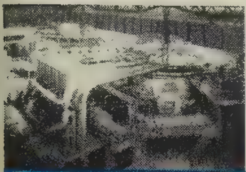
Temperature Dependence of the Yield Stress for Copper and Aluminum—W. D. Sylwestrowicz, Bell Telephone Laboratories.

Grain Boundary Deformation in Fine-Grained Electrolytic Magnesium—S. L. Couling, Dow Chemical Co.; C. S. Roberts, Shockley Semiconductors Laboratory.

Activation Energies for Creep of Single Aluminum Crystals Favorably Oriented for (111) (101) Slip—J. Lytton, L. Shepard, and J. E. Dorn, University of California.

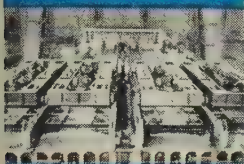
Size Effects in the Deformation of Aluminum: Part I—Bicrystals: Part II—Single Crystals—R. L. Fleischer and Bruce Chalmers, Harvard University.

Abrupt Yielding and the Ductile-to-Brittle Transition in Body-Cen-



Rotary billet heaters in France

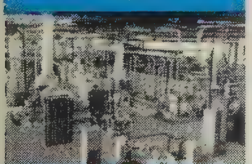
Pusher type hardening-tempering lines in Germany



Soaking pits in Italy

Soaking pits in Great Britain

Standard Allcase® furnace in Japan



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tered-Cubic Metals—E. T. Wesse Westinghouse Electric Corp.

Effect of Strain and Temper Em brittlement on the Impact Trans tion Temperature of an AISI E-615 Steel—E. F. Steeb, North Ameri can Aviation; P. C. Rosenthal, Uni versity of Wisconsin.

STRUCTURES AND PROPERTIES OF METALS AND ALLOYS

Embassy Room, Morrison Hotel

Preferred Orientations in Castings—Derek Walton, Harvard University

Reorientation Textures Developed b Isothermally Annealing Cold-Rolle Iodide Titanium—C. J. Sparks Jr Wright Air Development Center J. P. Hammond, Oak Ridge Na tional Laboratory.

Ductility in Beryllium Related t Grain Orientation and Grain Siz —J. Greenspan, Nuclear Metal Inc.

Effects of Various Preferred Orienta tions on the Dimensional Stabilit of Uranium—W. V. Cumming General Electric Co.

Dimensional Stability of U-Cr Alloy —M. C. Fraser, G. A. Last, an S. H. Bush, General Electric Co.

Study of the Effect of Reactor Ir radiation on the Microstructure o Uranium—T. K. Bierlein and B Mastel, General Electric Co.

Irradiation Effects on the Tensil Properties of Zircaloy-2—R. S Kemper Jr. and D. L. Zimmerman General Electric Co.

Brittleness and the Thermal Expan sion Behavior of Titanium Carbid Base Cermets—H. W. Newkir Jr., General Electric Co.; H. H Sisler, Ohio State University.

Estimation of Coefficients for the Re active Diffusion of Carbon in Zir conium Carbide—E. Hirakis an M. A. Steinberg, Horizons Inc.

Surface Tensions of Ag-Au and Cu Au Solid Solutions—S. S. White C. M. Adams Jr., and J. Wulff Massachusetts Institute of Tech nology.

Autoradiographic and Metallographi Evidence for a Metallic Secon Phase in High-Purity Zinc—I. S Servi, M. Stern, and W. W. Webb Electro Metallurgical Co.

Monday, Nov. 4—2 p.m.

TITANIUM METALLURGY

Cotillion Room, Morrison Hotel

Phase Transformation in Hypoeu tectoid Ti-Cr Alloys—H. I. Aaron son, W. B. Triplett, and G. M Andes, Carnegie Institute of Tech nology.

Notch Tensile Properties of Selecte Titanium Alloys—E. P. Klier, Syra cuse University; N. J. Feola, Cur tiss-Wright Corp.

Effect of Hydrogen on the Fatigu Properties of Titanium and Ti-M Alloys—L. W. Berger, W. S. Hyler and R. I. Jaffee, Battelle Memoria Institute.

Hydrogen Distribution in Heat Treat ed Titanium Alloys as Establishe by Autoradiography—O. J. Huber J. E. Gates, A. P. Young, M. Po berskin, and P. D. Frost, Battell Memorial Institute.

Hydrogen Solubility and Removal fo

Titanium and Titanium Alloys W. M. Albrecht and M. W. Mallett, Battelle Memorial Institute.

Effect of Crystallographic Orientation and Oxygen Content on Knoop Hardness Values of Iodide Titanium—C. Feng and C. Elbaum, University of Toronto.

Effect of Hydrogen on Some Mechanical Properties of a Titanium Alloy Heat Treated to High Strength—H. A. Robinson, P. D. Frost, and W. M. Parris, Battelle Memorial Institute.

SYMPOSIUM ON THE RELATION OF STRUCTURE AND HIGH-TEMPERATURE PROPERTIES

Grand Ballroom, Morrison Hotel

Influence of Carbon and Nitrogen on Creep and Creep-Rupture Properties and Structure of 18 Cr-8 Ni and 18 Cr-8 Ni-Mo Steels—G. V. Smith, Cornell University; F. Garofalo and L. Zwell, U. S. Steel Corp.

Effect of Interstitial Elements on the Properties of Cr-Mn-N-C Steels—Chi-Mei Hsiao and E. J. Dulis, Crucible Steel Co. of America.

Microstructural Changes in a 42% Ni-30% Cr-25% Fe Alloy During Creep Rupture Testing—E. P. Sadowski and R. J. Raudebaugh, International Nickel Co.

Nickel-Chromium Base Alloys Hardened With Refractory Oxide Additions—A. W. Cochandt, Westinghouse Electric Corp.

Contribution of Spherical and Platelike Precipitate Particles to Creep and Tensile Strength—E. E. Underwood, Battelle Memorial Institute.

Creep and Structural Studies of Two-Phase Al-Au Alloys—R. Pelloux, A. R. Chaudhuri, and N. J. Grant, Massachusetts Institute of Technology.

RESEARCH SUMMARIES ON STRUCTURE OF SOLID SOLUTIONS

Constitution Room, Morrison Hotel

Solubility of Hydrogen in Thorium Metal—D. T. Peterson and D. G. Westlake, Iowa State College.

Free Energy Changes Attending the Martensitic Transformation in the Fe-Cr and Fe-Cr-Ni Systems—Larry Kaufman, Massachusetts Institute of Technology.

Calculation of Entropies of Solute Atoms from Solid Solubilities—J. F. Freedman, Yale University; A. S. Nowick, Columbia University.

Elastic Interaction of Interstitial Atoms in Body-Centered Cubic Crystals—J. C. Fisher, General Electric Co.

Misfit Strain Energy in the Au-Cu System—Ralph Hultgren, University of California.

An Acoustical Study of Low-Temperature Aging in Al-4.2 Cu—M. E. Fine and C. Chiou, Northwestern University.

Alloying Behavior of Ni3Al (Y? Phase)—R. W. Guard and J. H. Westbrook, General Electric Co.

DEFORMATION AND OXIDATION

Embassy Room, Morrison Hotel

Hydrogen, Crack Initiation and Delayed Failure in Steel—H. H. Johnson, J. G. Morlet, and A. R. Troiano, Case Institute of Technology.

Fracture of Zinc Monocrystals and Bicrystals—J. J. Gilman, General Electric Co.

Temperature Dependence of Flow and Fracture in Coated Zinc Single Crystals—L. C. Weiner, Columbia University.

Pyramidal Slip in Magnesium—R. E. Reed-Hill and W. D. Robertson, Yale University.

Grain Boundary Shear in Aluminum—F. Weinberg, Department of Mines and Technical Surveys, Ottawa, Ont.

Delay Time in Face-Centered Cubic Metals—I. R. Kramer and H. R. Peiffer, Rias Inc.

Work Hardening on the Latent Slip Directions of Alpha-Brass During Easy Glide — W. L. Phillips and W. D. Robertson, Yale University.

Impurity Substructures in Zinc Single Crystals—H. G. F. Wilsdorf, Franklin Institute.

Oxidation of Zircaloy-2 and 3A at 300 to 850° C—E. A. Gulbransen and K. F. Andrew, Westinghouse Electric Corp.

Structural Aspects of the Corrosion of Stainless Steel at 500 to 700° C in Gaseous Atmospheres—E. A. Gulbransen, T. Copan, and D. van Rooyen, Westinghouse Electric Corp.

AIME PROGRAM . . .

Fabrication of Uranium Dioxide Fuel Element Shapes by Hydrostatic Pressing—H. W. Newkirk Jr. and R. J. Anicetti, General Electric Co.

Tuesday, Nov. 5—9 a.m.

SYMPOSIUM ON TITANIUM
Grand Ballroom, Morrison Hotel

Introductory Remarks—L. S. Busch, Mallory-Sharon Titanium Corp.

United States Progress in Titanium—1956-1957—W. J. Harris Jr., Battelle Memorial Institute.
(Question and Answer Period)

European Progress in Titanium
(Question and Answer Period)

SEMINAR ON SCIENCE OF METAL HARDENING
Cotillion Room, Morrison Hotel

Effect of Alloying on the High-Temperature Creep Properties of Metals—J. Weertman, U. S. Naval Research Laboratory.

Magnetic Study of Precipitation Hardening—J. D. Livingston, General Electric Co.

Strength of Age-Hardened Alloys—A. Kelly, Northwestern University.

Inhomogeneous Deformation in the Austenite - Martensite Transformation—D. S. Lieberman, University of Illinois.

NONFERROUS AND HIGH TEMPERATURE ALLOYS
Embassy Room, Morrison Hotel

Sand Cast Magnesium-Rare Earth Metal-Zirconium Alloys — T. E. Leontis, Dow Chemical Co.; D. H. Feisel, Carnegie Institute of Technology.

Blister Formation in Rolled Aluminum—J. H. O'Dette, Aluminum Laboratories Ltd., Canada.

On the Release of Hydrogen from Molten Aluminum—Asutosh Pal, Aunapurna Metal Works, India; H. M. Davis, Pennsylvania State University.

Elastic Properties of Yttrium and the Rare Earth Elements—J. F. Smith, C. E. Carlson, and F. H. Spedding, Iowa State College.

Gas Desorption of Copper Powders—J. C. Tobin, General Electric Co.; M. J. Sinnott, University of Michigan.

Copper-Silica and Copper-Alumina Alloys of High-Temperature Interest—K. M. Zwilsky and N. J. Grant, Massachusetts Institute of Technology.

Metallurgical Observations of Nitrides in Chromium—I. S. Servi and W. D. Forgeng, Electro Metallurgical Co.

Determination of Orientation in Magnesium by Polarized Light—C. W. Pearsall and S. J. Couling, Dow Chemical Co.

RECENT DEVELOPMENTS IN STEELMAKING PRACTICES
Session I
Exhibit Hall

Nitrogen Control and Nitrogen Content of Steels — K. G. Speith and H. vom Ende, Mannesmann-Huettenwerke A.G., Germany.

Observations Regarding Properties and Performance of Continuously Cast Low-Carbon Steel Products—R. N. Edmonson, L. Mair, and M. Tenenbaum, Inland Steel Co.

Vacuum Arc Melting—E. W. Johnson, Westinghouse Electric Corp.

Observations of the Russian Steel Industry—N. J. Grant, Massachusetts Institute of Technology.

Tuesday, Nov. 5—2 p.m.

SYMPOSIUM ON TITANIUM

Grand Ballroom, Morrison Hotel

Introductory Remarks—L. S. Busch, Mallory-Sharon Titanium Corp.

Opinions and Ideas on the Manufacture and Use of Titanium—N. E. Promisel, Bureau of Aeronautics, U. S. Navy, panel and discussion moderator.

Tuesday, Nov. 5—2 p.m.

RESEARCH SUMMARIES ON SCIENCE OF METAL HARDENING

Cotillion Room, Morrison Hotel

Solute Strengthening in 80% Ni-20% Cr Alloys—R. W. Guard, General Electric Co.

Substitutional Solution Hardening in Copper Alloys — Carl Wiseman, University of California.

Quench Hardening in Pure Gold—J. W. Kauffman and M. Meshii, Northwestern University.

Grain Boundary Sliding in Copper Bi-Crystals — J. Intrater and E. S. Machlin, Columbia University.

Effect of Carbide Dispersion on the Strength of Tempered Martensite—A. M. Turkalo and J. R. Low Jr., General Electric Co.

Dispersion Hardening by Spherical Particles — H. R. Peiffer, R. H. Read, and A. J. Shaler, Pennsylvania State University.

Detection of Dislocation Tilts and Strains by X-Rays—Larry Kaufman and S. A. Kulin, Massachusetts Institute of Technology.

NUCLEAR METALS

Embassy Room, Morrison Hotel

Effect of Heat Treatment on Hardness and Microstructure of U-Ti Alloys—D. L. Douglass and L. L. Marsh Jr., Battelle Memorial Institute.

Preferred Orientation in Rolled Uranium Rods — M. H. Mueller and H. W. Knott, Argonne National Laboratory; W. P. Chernock, Combustion Engineering Inc.; and P. A. Beck, University of Illinois.

Transformation Kinetics of U-Zr Alloys Containing 50 and 60% Uranium—J. J. Kearns, Westinghouse Electric Corp.

Uranium-Silicon Epsilon Phase—S. Isserow, Nuclear Metals Inc.

Irradiation Stability of Low-Weight Per Cent U-Zr Alloys—A. W. Willis, General Electric Co.

Metallography of Irradiated Uranium—Preparation; Cathodic Vacuum Etching; Replication — T. K. Bierlein, J. R. Morgan, and G. R. Mallett, General Electric Co.

Corrosion Mechanism of Uranium-Base Alloys in High-Temperature Water—M. W. Burkart and B. Lustman, Westinghouse Electric Corp.

A Mechanism by Which Zirconium and Titanium Inhibit Corrosion and Mass Transfer of Steels by Liquid Heavy Metals—O. F. Kammerer, J. R. Weeks, J. Sadofsky, W. E. Miller, and D. H. Gurinsky, Brookhaven National Laboratory.

AIME PROGRAM . . .

(Session II)
IRON AND STEEL DIVISION
CONTINUOUS STEELMAKING
Exhibit Hall

Some Thoughts on Continuous Steelmaking and Its Development—J. F. Elliott, Massachusetts Institute of Technology.

Discussion, panel of well-known metallurgists.

Tuesday, Nov. 5—6:30 p.m.

INSTITUTE OF METALS DIVISION
(Annual Fall Dinner)
Cotillion Room, Morrison Hotel

Toastmaster: W. R. Hibbard Jr., Chairman, Institute of Metals Division.

Welcome: Michael Tenenbaum, Chairman, Chicago Section AIME.

Speaker: John A. Wilson, Oriental Institute, University of Chicago.

Wednesday, Nov. 6—9 a.m.

SYMPOSIUM ON URANIUM AND URANIUM DIOXIDE
Grand Ballroom, Morrison Hotel

Development of Casting Techniques for Uranium and Uranium Alloys—G. E. Jaynes, D. T. Doll, and J. M. Taub, Los Alamos Scientific Laboratory.

Uranium Ingot Production at AEC Feed Materials Production Centers—B. J. Buntz, Mallinckrodt Chemical Works.

Induction Melting of Uranium-Base Alloys—N. J. Carson, Argonne National Laboratory.

Melting and Casting of U-Zr-Cb Alloys—N. J. Carson and J. E. Baird, Argonne National Laboratory.

Centrifugal Casting of U-Zr Alloy Rods—A. B. Shuck, Argonne National Laboratory.

Injection Casting of Uranium Fission Alloy Pins — F. L. Yaggee, J. E. Ayer, and H. F. Jelinek, Argonne National Laboratory.

Arc Melting of Uranium-Rich Alloys—W. H. Britton and W. V. Haynes, Westinghouse Electric Corp.

Press Forging of Ingot Uranium—J. A. Fellows and H. J. Schaffer, Mallinckrodt Chemical Works.

Rolling of Uranium — G. S. Hanks, J. M. Taub, and D. T. Doll, Los Alamos Scientific Laboratory.

FERROUS METALLURGY
Constitution Room, Morrison Hotel

Distribution of Boron in Gamma Iron Grains — R. M. Goldhoff, General Electric Co.; J. W. Spretnak, Ohio State University.

Some Observations on 885° F Embrittlement—G. F. Tisinai and C. H. Samans, Standard Oil Co. (Ind.)

Studies on the Behavior of Oxygen in Cast Iron — Gustaf Ostberg, Falu Kopparverk, Sweden.

Hot-Pressure Bonding of Iron to Aluminum—A. Bartoszak, J. Bedell, and S. Storchheim, Martin Co.

DIFFUSION
Cotillion Room, Morrison Hotel

Diffusion of the Elements of the I-B and II-B Sub-Groups in Silver—A. Sawatzky, Franklin Institute; F. E. Jaumot Jr., General Motors Corp.

Diffusion of Mg, Si, and Mo in Nickel—R. A. Swalin and R. Olsen, University of Minnesota; Alan Martin, Vanadium Corp. of America.

Molecular Diffusion and Interphase Transfer in the Solid-Copper-Molten Lead System — J. W. Gorman, Standard Oil Co. (Ind.); G. W. Preckshot, University of Minnesota.

Approximate Method for Calculations Using Concentration - Dependent Diffusion Coefficients—A. G. Guy, M. Golomb, and A. S. Yue, Purdue University.

TITANIUM
Embassy Room, Morrison Hotel

Analysis of Titanium Alloys by the Vacuum Fusion Method—H. Littmen, R. P. Barber, and H. P. Munger, Syracuse University.

Electrical Resistivity Anomalies in Titanium-Oxygen Alloys — R. J. Wasilewski, E. I. du Pont de Nemours & Co.

Interaction of Oxygen with Dislocations in Alpha Titanium and Its Effect on the Ductile-to-Brittle Transition—Devendra Gupta, New York University; Sheldon Weinig, Materials Research Corp.

Effect of Alpha-Beta Ratio on the Heat Treated Properties of Titanium Alloys—R. J. Quigg, E. L. Harmon Jr., and A. R. Troiano, Case Institute of Technology.

Grain Boundary Adsorption of Solutes and Its Effect on the Creep Properties of Alpha Titanium—J. Winter, New York University; Sheldon Weinig, Materials Research Corp.

AIME PROGRAM . . .

Elevated Temperature Characteristics of Internally Oxidized Titanium-Cerium Alloys—R. H. Hiltz Jr., and N. J. Grant, Massachusetts Institute of Technology.

Wednesday, Nov. 6—2 p.m.

SYMPOSIUM ON URANIUM AND URANIUM DIOXIDE
Grand Ballroom, Morrison Hotel

Extrusion of Uranium — P. Loewenstein, Nuclear Metals Inc.
Cold Working of Uranium — J. M. Taub, D. T. Doll, and G. S. Hanks, Los Alamos Scientific Laboratory.
Fusion Welding of Uranium—E. L. Brundige, D. T. Doll, G. S. Hanks, and J. M. Taub, Los Alamos Scientific Laboratory.
Powder Metallurgy of Uranium and Uranium Alloys — J. L. Zambrow, Sylvania-Corning Nuclear Corp.
Various Methods of Preparing Uranium Dioxide for Fuel Element Use—G. W. Thompkin, D. E. Rhodes, and C. M. Henderson, Mallinckrodt Chemical Works.
Fabrication of Bulk Form Uranium Dioxide for Use as Nuclear Reactor Fuel—J. Glatter, Westinghouse Electric Corp.
Fabrication of High-Density Uranium Dioxide Fuel Components for the First Pressurized Water Reactor Core—T. J. Burke, J. Glatter, H. R. Hoge, and B. E. Schaner, Westinghouse Electric Corp.

TRANSFORMATIONS
Constitution Room, Morrison Hotel

Micrographic Investigation of Precipitation in Pb-Sn Alloys—D. Turnbull and H. N. Treaftis, General Electric Co.
Mechanism of Precipitation in an Alloy of Copper with 2.5% Iron—J. B. Newkirk, General Electric Co.
Effect of High-Temperature Aging on the Development of Minor Phases in an Age-Hardening Nickel-Base Alloy—W. C. Bigelow, J. A. Amy, and L. O. Brockway, University of Michigan.
X-Ray Investigation of Recrystallized Aluminum—S. Weissman, Rutgers University.
Transformation Kinetics and Mechanical Properties of Zr-Mo Alloys—R. F. Domagala, D. W. Levinson, and D. J. McPherson, Armour Research Foundation.
Textures of Cold Rolled and Recrystallized Crystals of Si-Fe—J. L. Walter and W. R. Hibbard Jr., General Electric Co.
Information on "Nuclei" for Secondary Recrystallization in Si-Fe—C. G. Dunn, General Electric Co.; P. K. Koh, Allegheny Ludlum Steel Corp.
Intermetallic Compounds in Titanium Hardened Alloys—H. J. Beattie Jr., and W. C. Hagel, General Electric Co.

GENERAL METALLURGY
Cotillion Room, Morrison Hotel

Precipitation and Magnetic Annealing in a Cu-Co Alloy—J. J. Becker, General Electric Co.
Processing and Properties of Co-P+ Permanent Magnet Alloys—D. L. Martin, General Electric Co.
Elimination of Magnetic Effects in Be-Cu — Harold Bernstein, U. S. Naval Gun Factory.
Nitrides of Silicon—W. D. Forgeng, Electro Metallurgical Co.; B. F. Decker, General Electric Co.
CaCl-Type Ordered Structures in Binary Alloys of Transition Elements—T. V. Philip, Crucible Steel Co. of America; P. A. Beck, University of Illinois.
Atomic Size Effects in Cr3O-Type Structures—M. V. Nevitt, Argonne National Laboratory.
Some Internal Friction Studies in Columbium — R. W. Powers and Margaret V. Doyle, General Electric Co.
Effect of Crystal Orientation, Temperature, and Molten Zone Thickness in Temperature — Gradient Zone Melting—J. H. Wernick, Bell Telephone Laboratories.

RELATION OF STRUCTURE AND HIGH-TEMPERATURE PROPERTIES
Embassy Room, Morrison Hotel

Young's Modulus of Magnesium Alloys at Elevated Temperatures as a Function of Metallurgical Variables and Microstructure—R. W. Fenn Jr., Dow Chemical Co.
Structure and Creep Resistance of Magnesium Alloys — E. F. Emley, Magnesium Elektron Ltd., Swinton, Manchester, England.
Role of Recovery and Recrystallization on the Creep Rupture Behavior of 2S Aluminum—M. B. Happ and N. J. Grant, Massachusetts Institute of Technology.
Study of Structural Modifications of Steel During High-Temperature Deformation—C. Crussard and R. Tamhankar, Institute de Recherches de la Siderurgie, France.
Role of Subgrains in Creep—J. E. Dorn and L. Shephard, University of California.
Role of Grain Boundaries in Creep—E. R. Parker, University of California.

Thursday, Nov. 7, 9 a.m.

DEFORMATION AND RELATED PROBLEMS
Embassy Room, Morrison Hotel

Role of Polygonization in Creep — R. W. Guard, General Electric Co.
Comparison of the Creep-Rupture Properties of Nickel in Air and Vacuum—P. Shahinian and M. R. Achter, U. S. Naval Research Laboratory.
Deformation of Rhenium — A. T. Churchman, Associated Electrical Industries Ltd., England.
Internal Friction in Aluminum at Low Temperature — A. J. Filmer, G. J. Hutton, and T. S. Hutchison, Royal Military College of Canada.
Deformation of Aluminum Single Crystals at −77° C—A. Kelly and S. Sato, Northwestern University.
Resistivity Recovery in Cold Worked Aluminum—H. R. Peiffer and I. R. Kramer, Rias Inc.
Mechanical Behavior of Microcrystals—W. W. Webb and W. D. Forgeng, Electro Metallurgical Co.
Motion of Dislocations Opposed by a Frictional Force — H. R. Peiffer, Rias Inc.
Viscous Dislocation Motion in Li-F—J. J. Gilman and W. G. Johnston, General Electric Co.
Strength of Two-Phase Structures of Simple Geometry — H. R. Peiffer and R. H. Read, Rias Inc.; A. J. Shaler, Pennsylvania State University.

AIME PROGRAM . . .

POWDER METALLURGY

Madison Room, Morrison Hotel

Study of Sintering of Aluminum Oxides—George Kuczynski, University of Notre Dame.

Rate of Infiltration of Metals—K. A. Semlak and F. N. Rhines, Carnegie Institute of Technology.

An Investigation of the Effect of Specific Surface Area of Certain Iron Powders on the Properties of Specimens Hot Coined Therefrom—D. P. Ferriss and J. G. Byrne, Stevens Institute of Technology.

Some High-Temperature Properties of Nickel and Cobalt Alloy Powder Extrusions Containing Nonmetallic Dispersions—C. G. Goetzel and Eric Gregory, Sintercast Corp. of America.

Development of Superior Cobalt-Base Alloys by Hot Coining Metal Powders with Minor Additives — D. P. Ferriss, Stevens Institute of Technology.

Thursday, Nov. 7—2 p.m.

EQUILIBRIUM STUDIES

Embassy Room, Morrison Hotel

Delta Phase Field of the U-Zr Equilibrium Diagram—J. F. Duffey and C. A. Bruch, General Electric Co.

Constitution of the Uranium-Rich U-Cb and U-Cb-Zr Systems—A. E. Dwight and M. H. Mueller, Argonne National Laboratory.

Nature of the Ni-Cr System—R. O. Williams, Cincinnati Milling Machine Co.

Activity Measurements in the System Iron-Chromium — C. L. McCabe, R. G. Hudson, and H. W. Paxton, Carnegie Institute of Technology.

Thermodynamic Study of Liquid Pb-Zn Solutions—F. D. Rosenthal and G. J. Mills, California Institute of Technology; F. J. Dunkerley, Rolle Manufacturing Co.

Solid Solubility of Uranium in Thorium and the Allotropic Transformation of U-Th Alloys—W. B. Wilson, A. E. Austin, and C. M. Schwartz, Battelle Memorial Institute.

Liquid Miscibility Gap in the Quaternary System Fe-Cu-S-C at 1450° C—D. L. Douglass, Ohio State University.

Uranium-Columbium Alloy Diagram—B. A. Rogers, D. F. Atkins, E. J. Manthos, and M. E. Kirkpatrick, Iowa State College.

TRANSFORMATIONS, ALLOYS

Madison Room, Morrison Hotel

Growth of Pearlite—L. S. Darken, R. M. Fisher, and J. M. Galligan, U. S. Steel Corp.

Effect of Applied Tensile Stress on Phase Transformations in Steel—L. F. Porter, and P. C. Rosenthal, Brookhaven National Laboratory.

Nature and Kinetics of Precipitation in a 16 Per Cent Vanadium, 2.5 Per Cent Aluminum-Titanium Alloy—E. L. Harmon, Electro Metallurgical Co.; A. R. Troiano, Case Institute of Technology.

Effect of Heat Treatment on the Coercive Force of Aluminum-Iron Alloys in the Ordering Region — K. Foster and D. Pavlovic, Westinghouse Electric Corp.

Diffusion of Heat and Mass in Growth of Precipitates from Supersaturated Solutions—C. M. Adams Jr., Massachusetts Institute of Technology.

Abnormal Grain Growth in High-Purity, Extruded Magnesium — F. D. Rosenthal and G. J. Mills, California Institute of Technology.

A Contribution to the Phase Diagram of Ag-Cu-Cd—K. M. Weigert, Curtiss-Wright Corp.

Heat Treatment, Transformation Reactions and Mechanical Properties of Some High-Strength Zirconium-Base Alloys—H. A. Robinson, J. F. Doig, M. W. Mote, and P. D. Frost, Battelle Memorial Institute.

Solid Solubility of Carbon in Copper-Nickel Alloys — M. E. Nicholson, University of Minnesota.

Solubility of Hydrogen in the 50% U-Zr Alloys — E. A. Gulbransen, K. F. Andrew, and R. J. Ruka, Westinghouse Electric Corp.

Thermal Fatigue of Ductile Materials—I. Effect of Test Conditions on the Thermal Fatigue Life of S-816 and Inconel 550 — F. J. Clauss Lewis Flight Propulsion Laboratory; J. W. Freeman, University of Michigan.

Thermal Fatigue of Ductile Materials—II. Effect of Cyclic Thermal Stressing on the Stress-Rupture Life and Ductility of S-816 and Inconel 550 — F. J. Clauss, Lew Flight Propulsion Laboratory; J. Freeman, University of Michiga

Society for Nondestructive Testing

R. F. Holste, President

All Sessions—Morrison Hotel

Sunday, Nov. 3—afternoon

Chairman—Dr. Gerold H. Tenney, Los Alamos Scientific Laboratory.

Organization for International Co-operation in the Field of Nondestructive Testing.

Monday, Nov. 4—9 a.m.

Chairman — Carlton H. Hastings, Avco Mfg. Corp.

The Basis for Optimum Test Methods Selection.

Keynote Speakers—

Dr. James Thewlis, Atomic Energy Research Establishment, Harwell, Didcot, Berks, England; Dr. Georges A. Homes, Professeur a la Faculte Polytechnique de Mons et a l'Universite Libre de Bruxelles, Bruxelles, Belgium; Don M. McCutcheon, Westinghouse Atomic Power Division.

Invited Discusser—S. A. Wenk, University of California.

Monday, Nov. 4—2 p.m.

Group Discussion

Director—Raymond A. Pulk, Detroit Arsenal.

Tuesday, Nov. 5—9 a.m.

TECHNICAL PAPERS

Chairman—Dr. Warren J. McGonnagle, Argonne National Laboratory.

Nondestructive Testing of Nuclear Power Reactor Components.

Nondestructive Testing of Fuel Elements for DIDO—Dr. James Thewlis, Atomic Research Establishment, Harwell, England.

The Fundamentals of Different Radiation Measurements—Richard A. Nickerson, Sandia Corp.

NRU—Some of Its Special Testing Problems—A. J. Mooradian, Atomic Energy of Canada Ltd., Chalk River, Ont.

Dimensional Measurements Using Nondestructive Testing Techniques—Bernard Cunningham, Westinghouse Electric Corp.

Tuesday, Nov. 5—1:30 p.m.

MEHL HONOR LECTURE

Mottling in Radiographs of Aluminum-Silicon-Copper Alloy Permanent Mold Castings—Dr. Kent R. VanHorn, Aluminum Co. of America.

Annual Meeting—Society of Nondestructive Testing (U. S. A.) and meeting of section delegates.

Tuesday, Nov. 5—7 p.m.

Social hour and 1957 annual banquet. Presentation of honor awards for technical achievement.

Wednesday, Nov. 6—a.m. and p.m.

Summary of Monday and Tuesday Discussion Director, Raymond A. Pulk, Detroit Arsenal.

Chairman — Carlton H. Hastings, Avco Mfg. Corp.

The Relative Advantages and Limitations of Nondestructive Test Methods.

Keynote Speakers—Dr. H. Krainer, Forschungszentrale, Gebr. Bohler & Co., Kapfenberg, Austria; Douglas W. Ballard, Sandia Corp.; L. VanOuwerkerk, Roentgen Technische Dienst, Rotterdam, Holland.

Invited Discussers—Prof. Hiroshi Kihara, Toyko University; Al Cota, A. O. Smith Corp.

Thursday, Nov. 7—9 a.m.

Educational Program on Nondestructive Testing Techniques.

Chairman—Don T. O'Connor, Machlett Laboratories.

Co-Chairman — Franklin S. Catlin, Magnaflux Corp.

Orientation—Don T. O'Connor, chairman, SNT Education Committee.

Magnetic Particle Inspection—W. E. Thomas, Magnaflux Corp.

Principles of Radiography—William D. Kiehle, Eastman Kodak Co.

SNT PROGRAM . . .

Industrial Fluoroscopy — Walter R. Hampe, Westinghouse Electric Corp.
Radiographic Film Interpretation—Artie L. Pace, General Electric Co.
Penetrant Testing—Taber DeForest, Magnaflux Corp.

Thursday, Nov. 7—1:30 p.m.

Educational Program (continued)
Eddy Current Testing in Theory—Dr. Glenn O. McClurg, Magnaflux Corp.
Eddy Current Testing in Practice—John W. Allen, Oak Ridge National Laboratory, Union Carbide Nuclear Co.
Ultrasonic Testing Pulse Method—John C. Smack, Curtiss-Wright Corp.
Ultrasonic Testing Resonant Method—Peter K. Bloch, Branson Instruments Inc.
Question period for entire panel of lecturers.

Friday, Nov. 8—a.m. and p.m.

Summary of Wednesday and Thursday
Discussion Director — Raymond A. Pulk, Detroit Arsenal.
Chairman—Carlton H. Hastings, Avco Mfg. Corp.
Recommendations for Technical Development and Standardization.
Keynote Speakers—Dr. Richard Seifert, R. Seifert & Co., Hamburg, Germany; Prof. Oscar Masi, Fiat-Div. Siderurgique, Turin, Italy; Robert B. Oliver, Oak Ridge National Laboratory.
Invited Discussers—Dr. Werner Felix, Sulzer Bros Ltd., Winterthur, Switzerland; Donald C. Erdman, Metrol Inc.

IHEA

Industrial Heating Equipment Association

Walter H. Holcroft
President

Tuesday, Nov. 5—9 a.m.

Palmer House

Modernization in Heating for Hot Forming—P. H. Morse, Magnethermic Corp.
The Metallurgy of Annealing in Fractional Minutes—R. K. Wuerfel, Westinghouse Electric Corp.
Techniques and Metallurgy of Induction Vacuum Melting — Walter Jones, General Electric Co.
Convection and Radiation in High Speed Heating—R. J. Reed, North American Mfg. Co.
Influence of High Speed Strip Annealing on Metallurgical Properties—Gilbert J. Langenderfer, Surface Combustion Corp.
Automation in Heating and Quenching—N. K. Koebel, Lindberg Engineering Co.

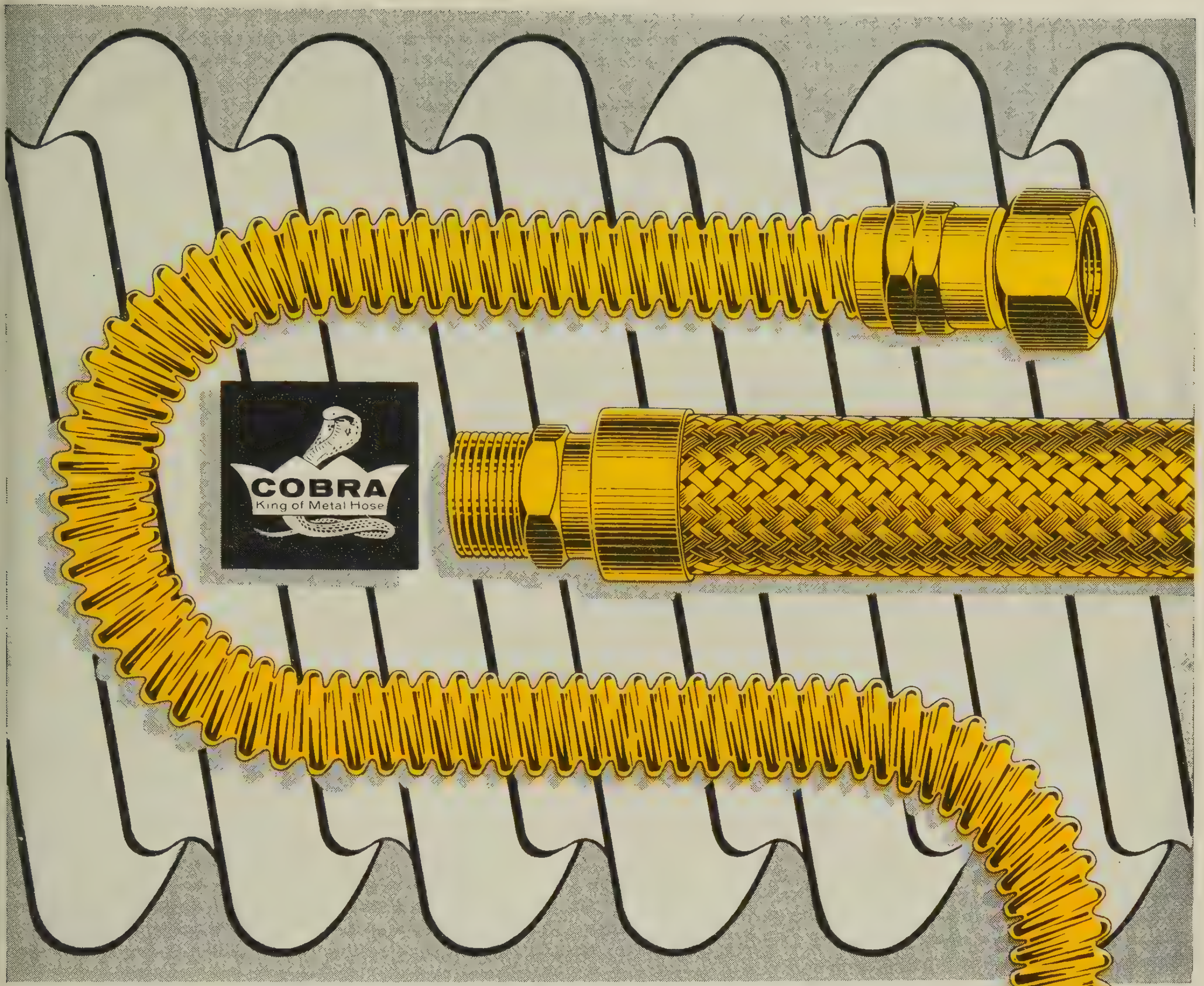
39th NATIONAL METAL CONGRESS & EXPOSITION

EXHIBITORS

Chicago's International Amphitheatre will house all exhibits. The exposition opens at noon, closes at 10:30 p.m. Monday, Tuesday and Wednesday. Hours on Thursday and Friday are 10 a.m. to 6 p.m. Here are the exhibitors and the booths they will occupy.

A. I. T. Diamond Tool Co. Inc., Skokie, Ill. 1714
Aaron Machinery Co. Inc., New York ..1505
Abrading Systems Co., Skokie, Ill. 1384
Acheson Colloids Co., Port Huron, Mich .. 112
Acme Steel Co., Chicago 441
Aircraft & Missiles Manufacturing, Philadelphia 456
Ajax Electric Co. Inc., Philadelphia 1406
Ajax Electrothermic Corp., Trenton, N. J. 1406
Ajax Engineering Corp., Trenton, N. J. ..1406
Ajusto Equipment Co., Toledo, Ohio 1498
Mark Alan & Associates, Chicago 1388
Al-Fin Div., Fairchild Engine & Airplane Corp., Deer Park, N. Y. 915
Allegheny Ludlum Steel Corp., Pittsburgh 648
Allis-Chalmers Mfg. Co., Milwaukee 935
Allison-Campbell Div., American Chain & Cable Co. Inc., Bridgeport, Conn. 1849
Alloy Engineering & Casting Co., Champaign, Ill. 442
Aloris Tool Co. Inc., Clifton, N. J. 1589
American Brake Shoe Co., New York 336
American Cast Iron Pipe Co., Birmingham 1376
American Chemical Paint Co., Ambler, Pa. 201
American Cyanamid Co., Metal Chemicals Section, New York 1815
American Cystoscope Makers Inc., New York 1764
American Gas Assn., New York 718, 723, 726, 727, 734, 735, 738, 742, 754
American Gas Furnace Co., Elizabeth, N.J. 726
American Herforder Corp., Chicago 1667
American Machine & Me'als Inc., East Moline, Ill. 820
American Machinist, New York 109
American Optical Co., Buffalo 1047
American Positive Grip Vise Corp., Willimansett, Mass. 1581
American Pullmax Co. Inc., Chicago 1065
American Silver Co., Flushing, N. Y. .. 815
American Society for Metals, Cleveland .. 553
Ampco Metal Inc., Milwaukee 1768
Amperex Electronic Corp., Hicksville, N. Y. 1630
Amplex Div., Chrysler Corp., Detroit ..1663
Apparatus Sales Div., General Electric Co., Schenectady, N. Y. 1468
Arnold Research Laboratories, Glendale, Calif. 1239
Arcair Co., Lancaster, Ohio 1271
Arcweld Mfg. Co., Grove City, Pa. 1019
Aro Spotwelder Div., Guthery Machine Tool Corp., Long Island City, N. Y. 1692
Associated Spring Corp., Bristol, Conn. ..1535
Atlantic Machine Tool Works Inc., Newington, Conn. 1549
Atlas Press Co., Kalamazoo, Mich. 1350
Atomic Energy Commission, Washington 1539

EXHIBITOR	BOOTH NO.
Audubon Wire Cloth Corp., Philadelphia	215
Automation, Cleveland	1028
Automation Instruments Inc., Pasadena, Calif.	153
Automotive Industries, Philadelphia	456
Babcock & Wilcox Co., Beaver Falls, Pa.	628
Baird-Atomic Inc., Cambridge, Mass.	265
Baker & Co. Inc., Newark, N. J.	119
Balcrank Inc., Cincinnati	1895
Baldwin-Lima-Hamilton Corp., Waltham, Mass.	1258
Ball Machinery Co., Chicago	448
Balteau Electric Corp., Stamford, Conn.	1373
Banner Welder Inc., Milwaukee	125
Barber-Colman Co., Rockford, Ill.	941
Barer Engineering & Machinery Co. Ltd., Montreal, Que.	502
Barry Controls Inc., Watertown, Mass.	1294
Bausch & Lomb Optical Co., Rochester, N. Y.	1054
Bede Products Corp., Amherst, Ohio	220
Bedford Gear & Machine Products Inc., Bedford, Ohio	129
Bendix Aviation Corp., Baltimore	1481
Beryllium Corp., Reading, Pa.	1688
Big Joe Mfg. Co., Chicago	136
Binks Mfg. Co., Chicago	1629
Bjorksten Research Laboratories for Industry Inc., Chicago	1893
Black & Decker Mfg. Co., Towson, Md.	241
Black Drill Co. Inc., Cleveland	419
G. S. Blakeslee & Co., Cicero, Ill.	1277
Bradley Washfountain Co., Miwaukee	1597
Branson Instruments Inc., Stamford, Conn.	1854
Branson Ultrasonic Corp., Stamford, Conn.	1854
Brinkmann Instruments Inc., Great Neck, N. Y.	835
British Industries Corp., Port Washington, N. Y.	1679
Charles Bruning Co. Inc., Chicago	1405
Brush Beryllium Co., Cleveland	531
Buck Mfg. Co., Los Gatos, Calif	1389
Buck Tool Co., Kalamazoo, Mich.	1036
Buda Div., Allis-Chalmers Mfg. Co., Milwaukee	935
Budd Co., Philadelphia	1715
Buehler Ltd., Evanston, Ill.	1235
C. I. T. Corp., New York	1741
Cam-Lok Div., Empire Products Inc., Cincinnati	1337
Campbell Machine Div., American Chain & Cable Inc., Bridgeport, Conn.	1849
Carlingo Commodities Corp., New York	1360
C. Robert Carlson Jr. Inc., a division of Overseas Commodex Corp., Detroit	1754
Carter Controls Inc., Lansing, Ill.	1794
Casting Engineers Inc., a division of Consolidated Foundries & Mfg. Co., Chicago	1794
Chainveyor Corp., Los Angeles	1826
Challenge Machinery Co., Grand Haven, Mich.	1059
Chicago Bridge & Iron Co., Chicago	1519
Chicago Foundry Co., Chicago	1689
Chicago Powdered Metal Products Co., Schiller Park, Ill.	1883
Chicago Rivet & Machine Co., Bellwood, Ill.	1835
Chicago Supply & Tool Co., Chicago	1456
Chilton Co., Philadelphia	456
Chrysler Corp., Detroit	1663
Cincinnati Milling & Grinding Machines Inc., Cincinnati	1798
Cincinnati Sub-Zero Products, Cincinnati	1583
Circo Equipment Co., Clark (Rahway), N. J.	1582
Robert H. Clark Co., Beverly Hills, Calif.	263
Clausing Div., Atlas Press Co., Kalamazoo, Mich.	1350
Clementina Ltd., San Francisco	1695
Cleveland Grinding Machine Co., Cleveland	860
Cleveland Metal Abrasive Co., Cleveland	831
Climax Molybdenum Co., New York	368
Coated Coil Corp., New York	1357
Cobalt Information Center, Battelle Memorial Institute, Columbus, Ohio	1314
Cold Metal Products Co., Youngstown	1127
Collins Microflat Co. Inc., Los Angeles	1880
Commander Mfg. Co., Chicago	1035
Commercial Shearing & Stamping Inc., Youngstown	1587
Consolidated Electrodynamics Corp., Rochester, N. Y.	1236
Consolidated Foundries & Mfg. Co., Chicago	1746
Continental Industrial Engineers Inc., Chicago	738
Cooke, Troughton & Simms Ltd., Chicago	1388
Cooper Metallurgical Associates, Cleveland	1579
Copper & Brass Research Assn., New York	1670
Copperweld Steel Co., Pittsburgh	526



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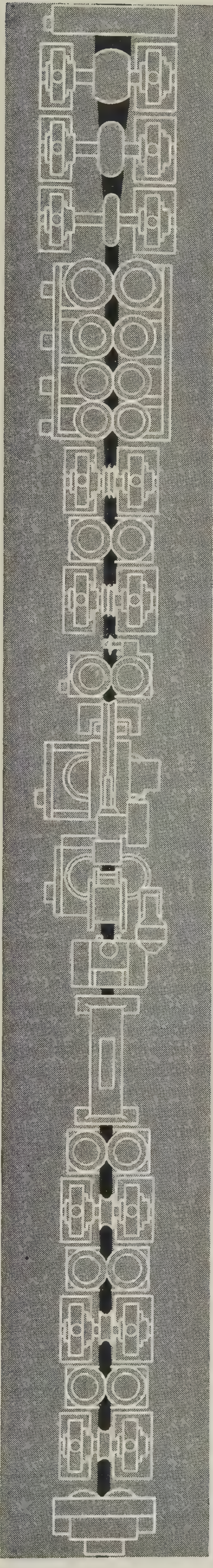
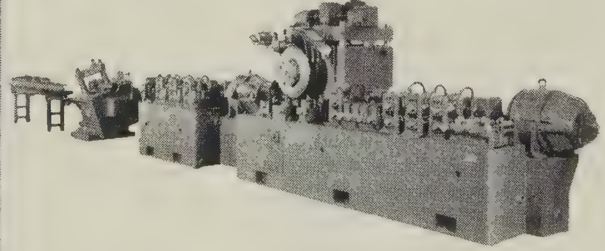
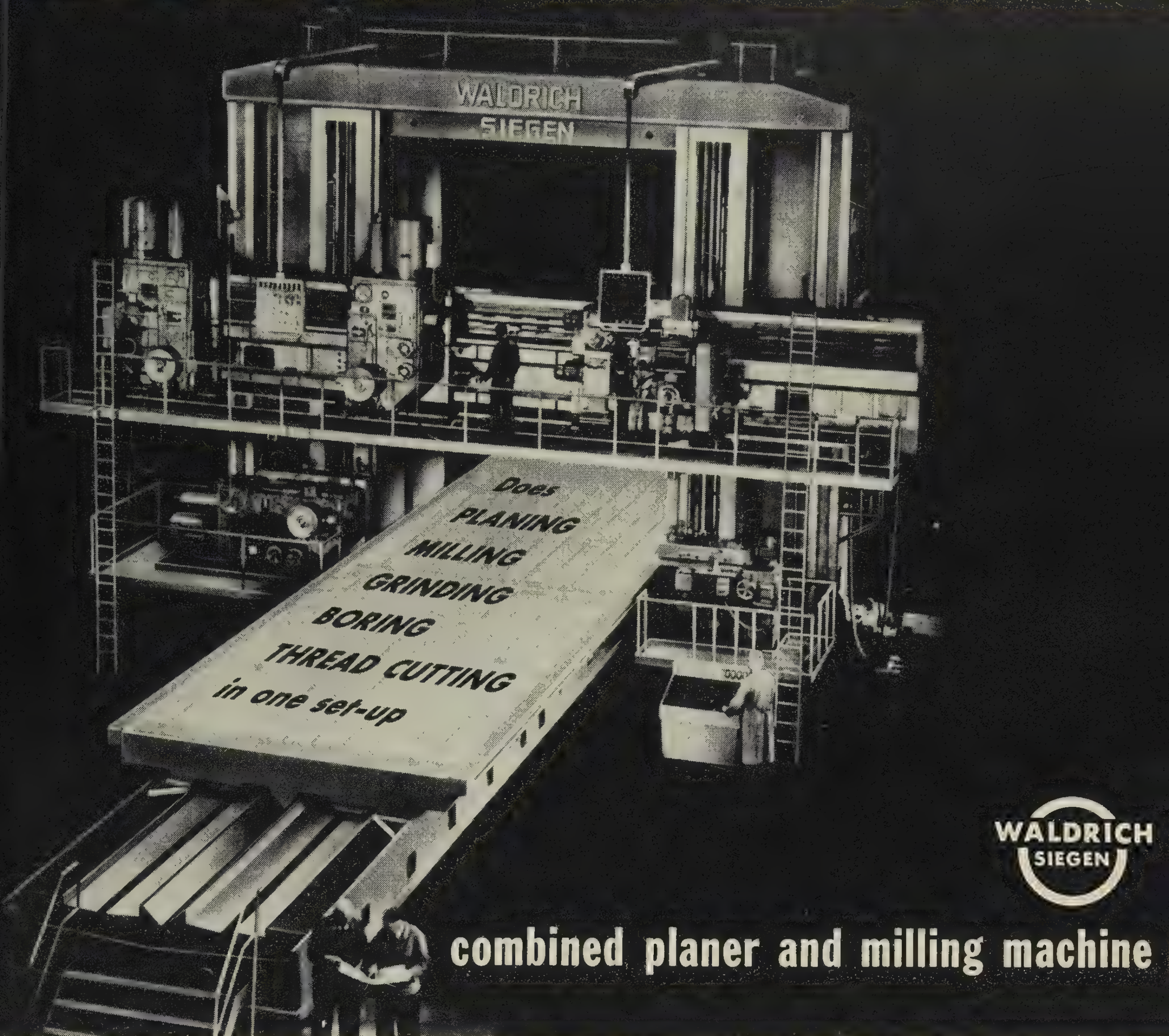
Crane Packing Co., Morton Grove, Ill.	1240
Curtiss-Wright Corp., Wood-Ridge, N. J.	602
Cushman & Denison Mfg. Co. Inc., New York	1887
Cycledynamics Inc., Detroit	1593
Dake Corp., Grand Haven, Mich.	960
Daubert Chemical Co., Chicago	1664
A. P. De Sanno & Son Inc., Phoenixville, Pa.	1220
Designers Metal Corp., Harvey, Ill.	1756
Detrex Chemical Industries Inc., Detroit	1316
Detroit Testing Machine Co., Detroit	848
DeVilbiss Co., Toledo, Ohio	1708
DeWalt Inc., Lancaster, Pa.	1285
DeZurik Shower Co., Sartell, Minn.	1792
Diesel Control Corp., Wilmington, Calif.	1588
Henry Disston Div., H. K. Porter Company Inc., Philadelphia	1863
Diversey Corp., Chicago	147
DoAll Co., Des Plaines, Ill.	360
Documentation & Communication Research Center, Western Reserve University, Cleveland	560
Doehler-Jarvis Div., National Lead Co., Toledo, Ohio	1506
Dow Chemical Co., Midland, Mich.	1790
Wilbur B. Driver Co., Newark, N. J.	1257
Drop Forging Assn., Lansing, Mich.	1491
Dry Clime Corp., Greensburg, Ind.	1755
DuBois Co. Inc., Cincinnati	1393
Dumore Co., Racine, Wis.	1839
E. I. du Pont de Nemours & Co. Inc., Wilmington, Del.	1845
Easco Products Div., Electro Arc Sales Co., Ypsilanti, Mich.	126
Eastman Kodak Co., Rochester, N. Y.	1429
Eclipse Fuel Engineering Co., Rockford, Ill.	73[illegible]
Electric Furnace Co., Salem, Ohio	1135
Electro-Alloys Div., American Brake Shoe Co., Elyria, Ohio	336
Electro Arc Mfg. Co., Ypsilanti, Mich.	126
Electro Dynamic Div., General Dynamics Corp., Bayonne, N. J.	1642
Electromark Corp., Cleveland	1484
Electro Metallurgical Co., a division of Union Carbide Corp., New York	539
Empire Products Inc., Cincinnati	1337
Enamelstrip Corp., New York	1357
Engelhard Industries, Newark, N. J.	119
Engis Equipment Co., Chicago	1644
Ettco Tool & Machine Co. Inc., Brooklyn, N. Y.	1487
Everite Machine Products Co., Philadelphia	1480
Exomet Inc., Conneaut, Ohio	1697
FabriSteel Products Inc., Detroit	1278
FAC Div., Overseas Commodex Corp., Detroit	1754
Fahralloy Co., Harvey, Ill.	144
Fairchild Engine & Airplane Corp., Hagerstown, Md.	915
Fansteel Metallurgical Corp., North Chicago, Ill.	1615
Fawick Airflex Div., Fawick Corp., Cleveland	855
Fawick Corp., Cleveland	855
Fenn Mfg. Co., Newington, Conn.	1250
Fenway Machine Co. Inc., Philadelphia	126
R. Y. Ferner Co. Inc., Malden, Mass.	1390
Firth Sterling Inc., Pittsburgh	1450
Flick-Reedy Corp., Melrose Park, Ill.	1660
Flinn & Dreffein Engineering Co., Chicago	137
Flow, Cleveland	1780
Foundry, Cleveland	1028
Foxboro Co., Foxboro, Mass.	1769
Friez Instrument Div., Bendix Aviation Corp., Baltimore	1481
Gaertner Scientific Corp., Chicago	1550
Garvin Bros. Inc., South Bend, Ind.	1282
Gas Appliance Service Inc., Chicago	754
Gaston Power Tools Div., R. M. Rumbold Co., Thornton, Ill.	137
General Alloys Co., Boston	548
General Dynamics Corp., New York	1642
General Fireproofing Co., Youngstown	435
General Ultrasonics Co., Hartford, Conn.	1219
Getchell Steel Treating Co. Inc., Minneapolis	1687
Goldsmith Bros. Smelting & Refining Co., Chicago	1022
B. F. Goodrich Aviation Products Div., B. F. Goodrich Co., Akron	347
Gray Co. Inc., Minneapolis	242
Grede Foundries Inc., Milwaukee	1637
Gregory Industries Inc., Lorain, Ohie	1476
Gries Reproducer Corp., New Rochelle, N. Y.	1343
Grotnes Machine Works Inc., Chicago	1592
Gulf Oil Corp., Pittsburgh	320
Guthery Machine Tool Corp., Long Island City, N. Y.	1692
Wm. J. Hacker & Co. Inc., New York	1254
Hammond Machinery Builders Inc., Kal-	

EXHIBITOR	BOOTH NO.
amazoo, Mich.	1311
Handy & Harman, New York	1415
Harmon & Co., Chicago	1587
Harper Electric Furnace Corp., Buffalo	409
H. M. Harper Co., Morton Grove, Ill.	1683
Harris Refrigeration Co., Cambridge, Mass.	1411
Hastings-Raydist Inc., Hampton, Va.	1785
Hauck Mfg. Co., Brooklyn, N. Y.	947
C. I. Hayes Inc., Cranston, R. I.	1306
Haynes Stellite Co., a division of Union Carbide Corp., Kokomo, Ind.	539
Heintz Mfg. Co., Philadelphia	1875
Heli-Coil Corp., Danbury, Conn.	216
Hevi-Duty Electric Co., Milwaukee	1819
High Vacuum Equipment Corp., Hingham, Mass.	1377
High Voltage Engineering Corp., Burlington, Mass.	325
Hitchiner Mfg. Co. Inc., Milford, N. H.	319
Hobart Bros. Co., Troy, Ohio	1251
Holcroft & Co., Detroit	819
Holger Andreasen Co., San Francisco	959
Charles A. Hones Inc., Baldwin, N. Y.	742
E. F. Houghton & Co., Philadelphia	1018
Howard Foundry Co., Chicago	927
Illinois Metal Products, Chicago	1680
Illinois Testing Laboratories Inc., Chicago	1353
Induction Heating Corp., Brooklyn, N. Y.	1207
Industrial & Commercial Gas Section, American Gas Assn., New York	735 & 754
Industrial Div., Minneapolis-Honeywell Regulator Co., Philadelphia	1042
Industrial Equipment News, New York	249
Industrial Furnace Div., Sunbeam Corp., Chicago	828
Industrial Heating, Pittsburgh	1441
Industrial Heating Equipment Co., Detroit	1558
Industrial Metals Div., American Silver Co., Flushing, N. Y.	815
Industrial Nucleonics Corp., Columbus, Ohio	1274
Industrial Press, New York	1361
Industrial Publishing Corp., Cleveland	1780
Industrial Tectonics Inc., Ann Arbor, Mich.	1121
Industry & Welding, Cleveland	1780
Instron Engineering Corp., Quincy, Mass.	1750
Instrument Div., American Optical Co., Buffalo	1047
Intercontinental Electronics Corp., Mineola, N. Y.	110
International Nickel Co. Inc., New York	542
Ionic Electrostatic Corp., Garfield, N. J.	301
Ipsen Industries Inc., Rockford, Ill.	1606
Iron Age, Philadelphia	456
Janney Cylinder Co., Philadelphia	1836
Jarrell-Ash Co., Newtonville, Mass.	1830
Jiffy Disintegrators Inc., Royal Oak, Mich.	1575
I. O. Johansson Co., Skokie, Ill.	928
S. C. Johnson & Son Inc., Racine, Wis.	1530
Jomac Inc., Philadelphia	1698
Kanthal Corp., Stamford, Conn.	842
C. M. Kemp Mfg. Co., Baltimore	727
Kennametal Inc., Latrobe, Pa.	1529
Keokuk Steel Casting Co., Keokuk, Iowa	1396
L. R. Kerns Co., Chicago	235
King Tester Corp., Philadelphia	924
Kinney Mfg. Div., New York Air Brake Co., Boston	1459
Kirksite Tool & Engineering Div., National Lead Co., New York	1506
Knight Models Inc., Chicago	1650
Kolcast Industries Inc., Cleveland	1326
Korhumel Steel & Aluminum Co., Evanston, Ill.	226
Kux Machine Co., Chicago	1659
L & L Mfg. Co., Upland, Pa.	1284
Laboratory Equipment Corp., St. Joseph, Mich.	1286
Lake Chemical Co., Chicago	1443
K. O. Lee Co., Aberdeen, S. Dak.	1397
Leeds & Northrup Co., Philadelphia	865
LeFiell Mfg. Co., Los Angeles	114
E. Leitz Inc., New York	1231
Lempco Industrial Inc., Bedford, Ohio	1740
Leonard Precision Products Co., Santa Ana, Calif.	954
Lepel High Frequency Laboratories Inc., Woodside, N. Y.	1848
Lewis Machine Co., Cleveland	1418
Light Metals Dept., American Brake Shoe Co., New York	336
Lindberg Engineering Co., Chicago	620
Linde Co., a division of Union Carbide Corp., New York	539
Link Engineering Co., Detroit	428
Lobeck Casting Processes Inc., New York	1649
Loma Machine Mfg. Co. Inc., New York	1649
Lufkin Rule Co., Saginaw, Mich.	1807
Lynchburg Foundry Co., Lynchburg, Va.	920





this 480 ton giant has 5 heads



No need to risk the inaccuracies that come from moving a workpiece weighing up to 100 tons from machine to machine for different operations. One set-up is all you need with this Waldrich Siegen machine. And just think of the tremendous savings in set-up time and costs.

Three milling heads take care of milling, boring and thread cutting operations; another head does planing and grinding; and there's a planer side head, too.

The Waldrich patented tool retracting mechanism in the planer head raises tool in a straight vertical plane after unclamping, repositions tool automatically, then reclamps. Cross rail is clamped hydraulically in exact horizontal position, located by separate electric drive. Built-in optics confirm accurate location.

Rigid, you bet—from top to bottom! Waldrich construction features a base plate crossing under machine and tying columns and bed into one ruggedly rigid unit. And there's a total of 900 h.p. working for you.

Write for all the specs on this mammoth producer. And ask a Waldrich engineer to discuss them in detail—in terms of your production needs.

WALDRICH SIEGEN

american waldrich mfg. corp.

1232 PENN AVENUE, PITTSBURGH 22, PENNSYLVANIA

EXHIBITOR	BOOTH NO.
M. B. I. Export & Import Ltd., New York	316
Machine Design, Cleveland	1028
Machinery, New York	1361
Magnaflux Corp., Chicago	1153
Magnetic Analysis Corp., Long Island City, N. Y.	948
Malayan Tin Bureau, Washington	341
Mallory-Sharon Titanium Corp., Niles, Ohio	1525
Man-Au-Cycle Corp. of America, Brooklyn, N. Y.	1550
Manco Mfg. Co., Bradley, Ill.	847
Manufacturers Processing Co., Detroit	1844
Marine Pumps Inc., a division of Diesel Control Corp., Wilmington, Calif.	1588
Markal Co., Chicago	1443
Martindale Electric Co., Cleveland	1292
Maserati Corp. of America, Westbury, N. Y.	1605
McGraw-Hill Publishing Co., New York	109
Mead Specialties Co. Inc., Chicago	1040
Melray Mfg. Co., Franklin Park, Ill.	1857
Metal Chemicals Section, American Cyanamid Co., New York	1815
Metal Finishing Service, Chicago	1492
Metal Lubricants Co., Chicago	1788
Metal Powder Assn., New York	619
Metal Progress, Cleveland	553
Metal Removal Co., Chicago	1667
Metallizing Co. of America, Chicago	1868
Metallizing Engineering Co. Inc., Westbury, N. Y.	1760
Metallurgical Products Dept., General Electric Co., Detroit	1368
Metals Engineering Institute, Cleveland	553
Metals Review, Cleveland	553
Metalwash Machinery Corp., Elizabeth, N. J.	734
Metalworking Publishing Co. Inc., Boston	1891
Met-L-Chek Co., Pittsburgh	1385
Michigan Standard Alloy Casting Co., a division of Ebaloy Inc., Detroit	1446
Micrometrical Mfg. Co., Ann Arbor, Mich.	1227
Milband Div., Henry G. Thompson & Son Co., New Haven, Conn.	1545
Miller Fluid Power Div., Flick-Reedy Corp., Melrose Park, Ill.	1660
Minneapolis-Honeywell Regulator Co., Minneapolis	1042
Minnesota Mining & Mfg. Co., St. Paul	1212
Mitchell Radiation Products Corp., Norristown, Pa.	1385
Mitts & Merrill Inc., Saginaw, Mich.	1479
Modernair Corp., San Leandro, Calif.	1879
Modern Industrial Press, Chicago	217
Modern Railroads, Chicago	217
Monarch Tools Inc., a division of Rankin Bros. Engineering & Sales Inc., Lynwood, Calif.	1682
Morehouse Industries, Los Angeles	1382
NRC Equipment Corp., Cambridge, Mass.	1426
National Carbon Co., a division of Union Carbide Corp., New York	539
National Distillers & Chemical Corp., New York	1525
National Lead Co., New York	1506
National Malleable & Steel Castings Co., Cleveland	1735
National Metal Abrasive Co., Cleveland	1289
National Plating & Processing Co., San Diego, Calif.	1295
National Research Corp., Cambridge, Mass.	1426
National-Standard Co., Secaucus, N. J.	1745
National-U. S. Radiator Corp., Johnstown, Pa.	625
National X-Ray Products Corp., Hackensack, N. J.	1872
Nelson Stud Welding Div., Gregory Industries Inc., Lorain, Ohio	1476
New Equipment Digest, Cleveland	1028
New Hermes Engraving Machine Corp., New York	1339
New York Air Brake Co., New York	1459
North American Philips Co. Inc., New York	1630
North American-Viking Drill Co., St. Paul	1335
Nuclear Systems Div., Budd Co., Philadelphia	1715
Oakite Products Inc., New York	247
Ohio Crankshaft Co., Cleveland	236
Ohio Seamless Tube Div., Copperweld Steel Co., Shelby, Ohio	526
Oil-Dyne Inc., Chicago	219
Tinius Olsen Testing Machine Co., Willow Grove, Pa.	1346
Opplem Co. Inc., East Rutherford, N. J.	1288
Opto-Metric Tools Inc., New York	1223
Oregon Metallurgical Corp., Albany, Oreg.	430
Osborn Mfg. Co., Cleveland	1330
Overseas Commodex Corp., Detroit	1754
Pacific Industrial Mfg. Co., Oakland, Calif.	1576
Pangborn Corp., Hagerstown, Md.	1263
Pantex Mfg. Corp., Pawtucket, R. I.	1598
Park Chemical Co., Detroit	637

EXHIBITOR	BOOTH NO.
Charles Parker Co., Meriden, Conn	841
Geo. C. Patterson Machine Co., Cleveland	1522
Pedrick Tool & Machine Co., Philadelphia	1853
Penn Precision Products Inc., Reading, Pa.	120
Penton Publishing Co., Cleveland	1028
Perkins Machine Co., Warren, Mass.	1811
Petersen Oven Co., Franklin Park, Ill.	1291
Phillips Electronics Inc., Mt. Vernon, N. Y.	825
Phillips Mfg. Co., Chicago	825
Picker X-Ray Corp., White Plains, N. Y.	959
Pines Engineering Co. Inc., Aurora, Ill.	1675
Pioneer Aluminum Inc., Los Angeles	1506
Plastic Metals Div., National-U. S. Radiator Corp., Johnstown, Pa.	625
Plew Tool Co. Inc., Ft. Wayne, Ind.	315
H. K. Porter Company Inc., Pittsburgh	1863
Portomag Inc., Ferndale, Mich	1159
Powdered Metal Products Div., Yale & Towne Mfg. Co., Franklin Park, Ill.	1776
Precision Extrusions, Bensenville, Ill.	118
Precision Metal Molding, Cleveland	1780
Pressco Casting & Mfg. Corp., Chesterton, Ind.	142
Process Machinery Div., Cincinnati Milling Machine Co., Cincinnati	1798
Production Equipment, Chicago	1488
Production Machine Co., Greenfield, Mass.	210
Prutton Corp., Cleveland	1522
Punch Products Corp., Niagara Falls, N. Y.	1759
Pyrometer Instrument Co. Inc., Bergenfield, N. J.	1744
Radio Corp. of America, Camden, N. J.	1494
Rankin Bros. Engineering & Sales Inc., Lynwood, Calif.	1684
Ransburg Electro-Coating Corp., Indianapolis	160
Reactive Metals Inc., New York	1525
Rebuilders Machinery Sales Inc., Chicago	928
Reliance Electric & Engineering Co., Cleveland	1656
J. A. Richards Co., Kalamazoo, Mich.	1497
Riehle Testing Machines Div., American Machine & Metals Inc., East Moline, Ill.	820
Rochester Div., Consolidated Electrodynamics Corp., Rochester, N. Y.	1236
Rothern Engineering Co. Inc., Chicago	1290
R. M. Rumbold Co., Thornton, Ill.	137
Joseph T. Ryerson & Son Inc., Chicago	636
S & S Machinery Co., Brooklyn, N. Y.	1559
Salkover Metal Processing of Illinois Inc., Chicago	140
Sandex Automation Inc., Brooklyn, N. Y.	1585
Sandusky Foundry & Machine Co., Sandusky, Ohio	1731
George Scherr & Co., New York	1550
Scientific Electric Co., Garfield, N. J.	301
Scott Paper Co., Chester, Pa.	1890
Scully-Jones & Co., Chicago	1791
Selas Corp. of America, Dresher, Pa.	718
Sentry Co., Foxboro, Mass.	150
Service Diamond Tool Co., Ferndale, Mich.	1341
Service Machine Co., Chicago	1759
Sheffield Corp., Dayton, Ohio	1645
Sheldon Machine Co. Inc., Chicago	1864
Shell Oil Co., New York	310
Sieburg Industries Inc., New Britain, Conn.	1783
Sinclair Refining Co., New York	1475
SKIL Corp., Chicago	1787
Smith Welding Equipment Corp., Minneapolis	1867
Socony Mobil Oil Co. Inc., New York	1676
South Chester Corp., Lester, Pa.	1027
Southco Div., South Chester Corp., Lester, Pa.	1027
Special Libraries Assn., Chicago	1515
Special Machinery & Engineering Inc., Detroit	1386
Special Products Div., American Cast Iron Pipe Co., Birmingham	1376
Spee-Flo Co., Houston	1798
Spencer Turbine Co., Hartford, Conn.	723
Sperry Products Inc., Danbury, Conn.	1053
Spitfire Tool Co., Chicago	1636
Stanat Mfg. Co., Westbury, N. Y.	1442
Standard Electrical Tool Co., Cincinnati	1641
Standard Oil Co. (Indiana), Chicago	1564
Stanley Electric Tool Div., Stanley Works, New Britain, Conn.	1876
Stanley Works, New Britain, Conn.	1876
Star Expansion Industries Corp., New York	1380
Starlite Industries, Philadelphia	1889
L. S. Starrett Co., Athol, Mass.	1730
STEEL, Cleveland	1028
Steel City Testing Machines Inc., Detroit	1729
Steel Sales Corp., Chicago	530
Edwin B. Stimpson Co. Inc., Brooklyn, N. Y.	342
F. J. Stokes Corp., Philadelphia	631
Strip Steel Div., Jones & Laughlin Steel Corp., Pittsburgh	1127

EXHIBITOR	BOOTH NO.
Stroman Furnace & Engineering Co., Franklin Park, Ill.	1291
Sun Steel Co., Chicago	1591
Sunbeam Corp., Chicago	828
Sunnen Service Corp., St. Louis	1490
Superior Tube Co., Norristown, Pa.	209
Supreme Products Corp., Chicago	1861
Surface Combustion Corp., Toledo, Ohio	516
Swedish Crucible Steel Co., Detroit	1843
Tapmatic Corp., Costa Mesa, Calif.	1859
Tatnall Measuring Systems Co., Philadelphia	1715
Taylor Instrument Co., Rochester, N. Y.	1885
Technic Inc., Providence, R. I.	1025
Tempil° Corp., New York	1041
Tensilkut Div., Sieburg Industries Inc., New Britain, Conn.	1783
The Texas Co., New York	365
Thomas Publishing Co., New York	249
Thomas' Register of American Manufacturers, New York	249
Henry G. Thompson & Son Co., New Haven, Conn.	1545
Thor Power Tool Co., Chicago	436
Arthur Tickle Engineering Works Inc., Brooklyn, N. Y.	919
Timesaver Products Co. of Illinois, Chicago	1342
Tin Research Institute Inc., Columbus, Ohio	1048
Tinnerman Products Inc., Cleveland	1568
Titanium Metals Corp. of America, New York	260
Tocco Div., Ohio Crankshaft Co., Cleveland	236
Torrington Mfg. Co., Torrington, Conn.	1567
Torsion Balance Co., Clifton, N. J.	936
Triplett & Barton Inc., Burbank, Calif.	1829
Tru-Seal Div., Flick-Reedy Corp., Melrose Park, Ill.	1660
Tubular Micrometer Co., St. James, Minn.	1550
Tubular Rivet & Stud Co., Wollaston, Mass.	1779
Turco Products Inc., Los Angeles	1367
Uddeholm Co. of America Inc., New York	942
Union Carbide Corp., New York	539
Union Mfg. Co., New Britain, Conn.	841
Unit Process Assemblies Inc., New York	1023
United Scientific Co., Boston	1736
U. S. Chemical Milling Corp., Manhattan Beach, Calif.	426
U. S. Department of Commerce, Washington	1555
U. S. Electrical Motors Inc., Chicago	1268
United States Gypsum Co., Chicago	1724
U. S. Industrial Chemicals Co., New York	1525
Universal Castings Corp., Chicago	1652
Universal Construction Kits, Detroit	1754
Universal-Cyclops Steel Corp., Bridgeville, Pa.	1546
Universal Gear Works Inc., Detroit	1230
Upton Electric Furnace Co., Roseville, Mich.	641
Utility Supply Co., Chicago	1486
Vacuum Equipment Div., New York Air Brake Co., New York	1459
Vanadium-Alloys Steel Co., Latrobe, Pa.	326
Vanadium Corp. of America, New York	854
Vanguard Engineering Co., Cleveland	1841
Vapor Blast Mfg. Co., Milwaukee	1394
Vascoloy-Ramet Corp., Waukegan, Ill.	1615
Waldes Truarc Retaining Ring Div., Waldes Kohinoor Inc., Long Island City, N. Y.	836
Waldes Kohinoor Inc., Long Island City, N. Y.	836
Wales-Strippit Corp., Akron, N. Y.	1749
Watson Publications Inc., Chicago	217
Waukee Engineering Co. Inc., Milwaukee	1842
Weatherhead Co., Ft. Wayne, Ind.	315
Welding Illustrated, Cleveland	1780
Wells Mfg. Co., Three Rivers, Mich.	1775
Weltronic Co., Detroit	1860
Western Gold & Platinum Co., Newark, N. J.	1257
West Instrument Co., Chicago	1060
Westinghouse Electric Corp., Pittsburgh	1616
Weston Electrical Instrument Corp., Newark, N. J.	248
Wheelabrator Corp., Mishawaka, Ind.	1430
Wheelco Instrument Div., Barber-Colman Co., Rockford, Ill.	941
Wilson-Carr Inc., Chicago	1488
Wilson Mechanical Instrument Div., American Chain & Cable Co. Inc., Bridgeport, Conn.	953
Wire Machinery Inc., Chicago	1522
Yale & Towne Mfg. Co., New York	1776
Zaco Laboratories Div., Zip Abrasive Co., Cleveland	139
Carl Zeiss Inc., New York	965
Zenith Foundry Co., West Allis, Wis.	1137
Ziv Steel & Wire Co., Chicago	1381

On Display at the Show

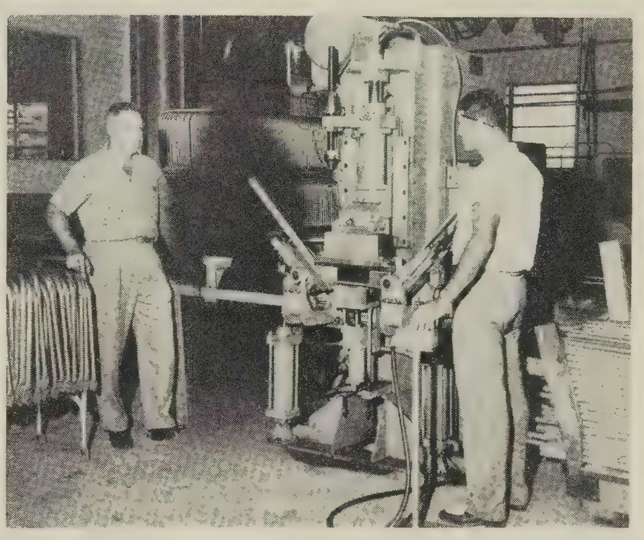
Tube Bending Press Can Make up to 1000 Frames an Hour

Model 6-T is designed to form U-frames having two bends, such as are commonly found on chair backs. The press can also be used for making single bends. It forms steel or aluminum tubes, two at a time.

The distance between die centers is adjustable for different size frames. Maximum capacity when bending two tubes is 1-in. OD steel with a 0.065-in. wall.

Wrinkle free bends can be made in 1-in. OD steel tubing to a $2\frac{1}{2}$-in. centerline radius. Steel tubing $\frac{7}{8}$ in. in outside diameter can be formed to a $1\frac{1}{2}$-in. centerline radius.

The two bends in a frame can be made to different angles. If there are two 90-degree bends, collapsible dies are used so that the finished parts are released from the die grooves quickly. *Write*: Pines Engineering Co. Inc., 601 Walnut St., Aurora, Ill. *Phone*: Aurora 6-7701 (Metal Show Booth 1675)



Rotary Drum Degreaser Handles a Wide Range of Operations

Nuts, bolts, fasteners, stampings, and screw machine parts are cleaned thoroughly by Model 1DD750. This machine combines solvent degreasing with automated work handling.

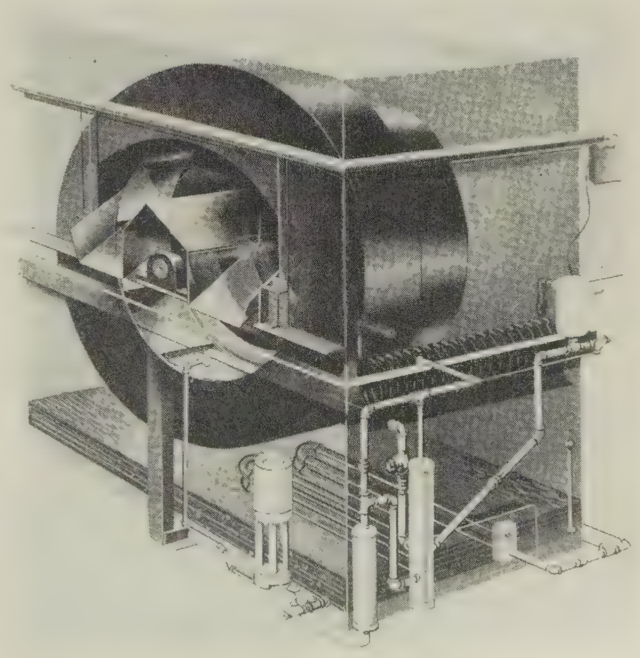
In-process cleaning; cleaning before heat treatment; cleaning before plating, phosphatizing, bright dipping, etc.; and final cleaning are done by the machine.

The steam heated unit is $6\frac{1}{2}$ ft wide, 6 ft high, and 4 ft in the direction of the work flow.

The degreaser handles 5 cu ft an hour. Rated capacity is 2000 lb of steel or brass parts an hour.

Parts to be cleaned enter the degreaser through a conventional chute. They are carried through the machine by a screw-type drum which tumbles the parts, subjects them to vapor and immersion cleaning, final vapor rinse, and drying.

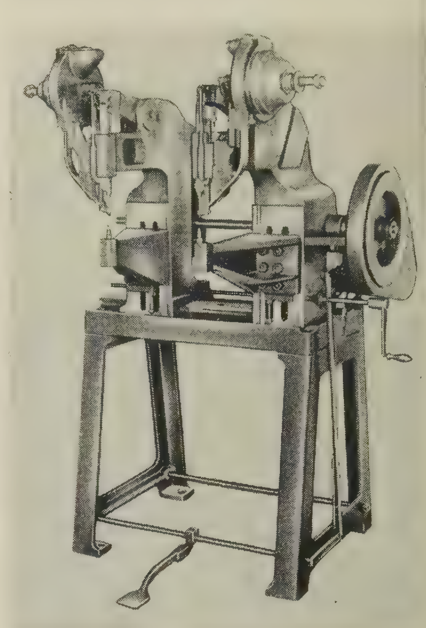
The parts are then discharged through a chute on the opposite side of the machine. *Write*: Detrex Chemical Industries Inc., Box 501, Roosevelt Park Annex, Detroit 32, Mich. *Phone*: Townsend 8-8600 (Metal Show Booth 1316)



NEW PRODUCTS and equipment

Riveting Machine

Model 109 automatically feeds and sets two rivets at the same time. The rivets may be of different styles and lengths. Diameters up to 0.200 in. can be handled.



The machine has a 12-in. throat. A hand crank adjusts center distances from $\frac{5}{8}$ to 16 in. Minimum center distance can be reduced to $\frac{1}{4}$ in. by modifying the machine. *Write*: Tubular Rivet & Stud Co., Weston Avenue, Wollaston 70, Mass. (Metal Show Booth 1779)

Heat Treating

B Model P-6-3030 is a pusher tray furnace with an integrated oil quench and a self-purging charge vestibule. The furnace is serviced at each end by semiautomatic loading and unloading equipment.

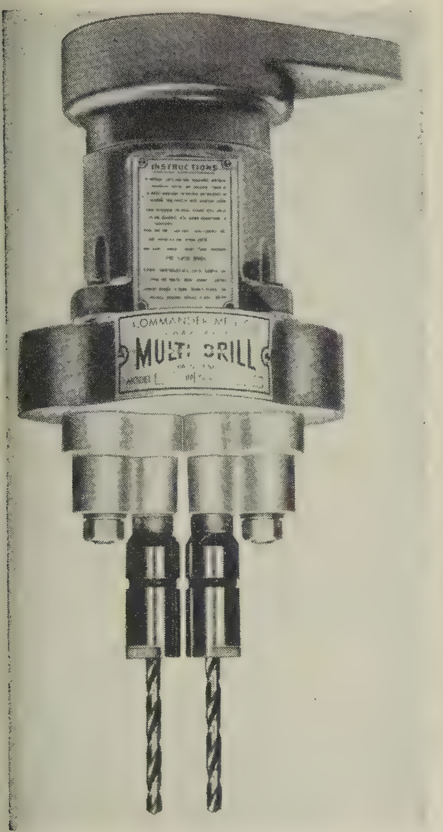
The production unit does bright carburizing. The first zone has an initial heating capacity of 1000

lb of steel an hour. Two additional zones afford soaking interval control.

All zones are designed for 100 per cent forced circulation heating. *Write*: Ipsen Industries Inc., 715 S. Main St., Rockford, Ill. *Phone*: 5-9581 (Metal Show Booth 1606)

Multiple Drilling

Multi-Drill 400 is a close coupled, multiple spindle drilling attachment which can be furnished to fit any drill press.



The unit is available with 2, 3, or 4 spindles. Drill capacity in steel is ¼ in. *Write*: Commander Mfg. Co., 4233 W. Kinzie St., Chicago 24, Ill. *Phone*: Sacramento 2-4544 (Metal Show Booth 1035)

Spectrographic Analyzer

The Automatic Spectro-Lecteur is a direct reading instrument which permits the measurement of instantaneous values.

Two photomultipliers are used. One views the line of the base metal in the alloy. The other

travels automatically along the focal plane of the spectrum, stopping at selected lines according to a prearranged program. This gives a continuous measurement of instantaneous values of the intensity ratio between the recorded lines and the line of the base metal.

All metals are recorded according to their own period of stability. Analysis of a metal alloy including

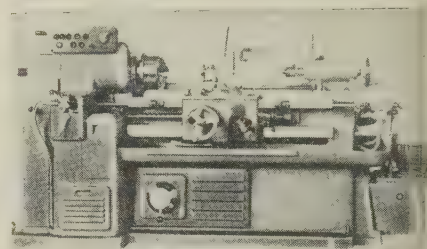
six elements can be completed in 57 seconds.

Changeover from one alloy to another with the same base metal takes less than 1 minute. If the base metal is different, 5 minutes are required. *Write*: Intercontinental Electronics Corp., 1551 Franklin Ave., Mineola, N. Y. *Phone*: Pioneer 2-0600 (Metal Show Booth 110)

Thread Cutting Lathe

This single point, thread cutting lathe has a 13 in. diameter swing. Thread cutting length is 32 in. The lead capacity is from 0.0250 in. to 2.00 in.

A 2-in. hole runs through the headstock. An electromagnetic clutch and brake provide instantaneous starting and stopping.

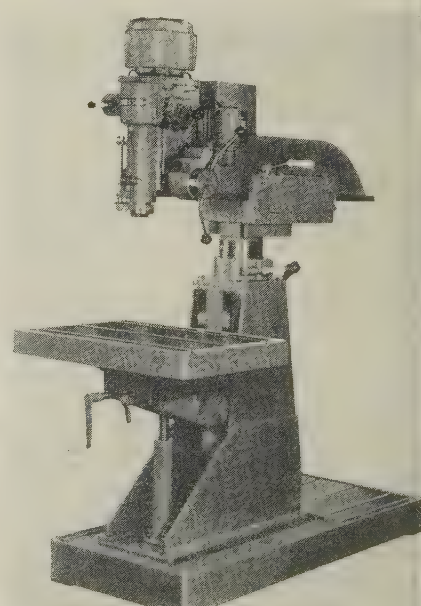


Cutting speeds of 400 lineal inches per minute are provided. *Write*: Man-Au-Cycle Corp. of America, 132 53rd St., Brooklyn, N. Y. *Phone*: Hyacinth 2-6561 (Metal Show Booth 1550)

Radial Drill

This ram-type machine can drill holes up to 18 in. deep. A compound angle attachment makes it possible to drill holes on any compound angle by rotating the drill head in two planes.

The machine has a drilling area



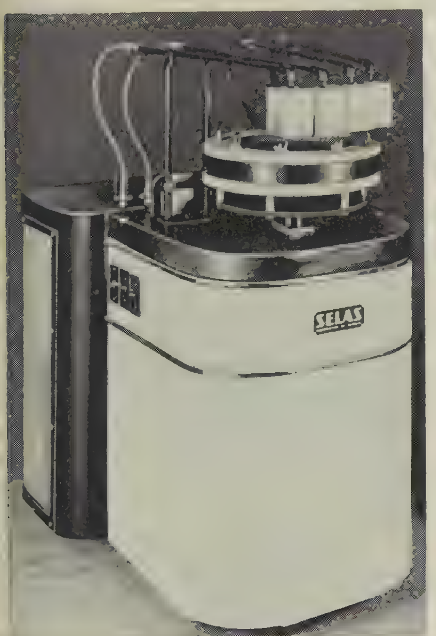
of 14.8 sq ft and handles workpieces over 4 ft high and over 4 ft in diameter.

The drill head provides spindle speeds from 78 to 1200 rpm. Speeds can be selected while the machine is rotating. Drills up to 1¾ in. in diameter can be used.

The machine can be converted instantly to a semiautomatic tapping machine. *Write*: I. O. Johansson Co., 7248 St. Louis Ave., Skokie, Ill. *Phone*: Orchard 3-9234 (Metal Show Booth 928)

Brazing Machine

Lighter parts are brought to temperature in 15 seconds by four Duradiant gas-fired burners. Production rate of this unit reaches 1800 an hour. It is automatic.



The machine does silver brazing and similar joining operations. *Write*: Selas Corp. of America, Dresher, Pa. *Phone*: Mitchell 6-6600 (Metal Show Booth 718)

Chemical Milling

This process can remove metal where tools can't reach—on extrusions, forgings, and preformed sheets.

Aluminum, magnesium, steel, and titanium can be milled chemically. *Write*: U. S. Chemical Milling Corp., 1700 Rosecrans, Manhattan Beach, Calif. *Phone*: Oregon 8-4041 (Metal Show Booth 425)

Paper Wipers

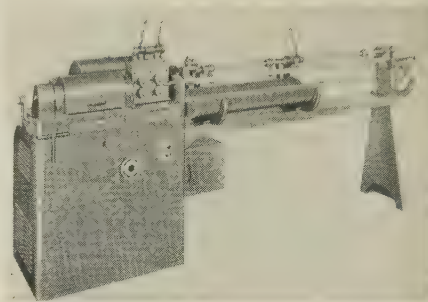
Lint-free paper wipers can be used for industrial operations and for keeping face and hands clean.

They eliminate the chance of work being marred by chips which become embedded in used wipers. *Write*: Scott Wipers, Industrial Packaged Products Div., Scott Paper Co., Chester, Pa. *Phone*: Chester 4-4211 (Metal Show Booth 1890)

Wire Straightener

The 2CV Convertible series of wire straightening and cutting machines uses a dual-center straightening arbor which makes it possible to precision straighten small diameters.

A variable speed drive provides feeds up to 200 fpm. The machines come equipped with an arbor for handling round wire. They can be converted quickly to handle shapes,



hexagonals, or flats by installing an interchangeable roll straightener. *Write*: Lewis Machine Co., 3441 E. 76th St., Cleveland 27, Ohio. *Phone*: Michigan 1-3015 (Metal Show Booth 1418)

Furnace

Model Y furnace is used to harden all types of high speed and high carbon, high chrome steels.

Tools can be soaked to assure maximum hardness without formation of scale or decarburization. A

neutral atmosphere is produced automatically. *Write*: Sentry Co., Foxboro, Mass. *Phone*: Kingswood 3-5330 (Metal Show Booth 150)

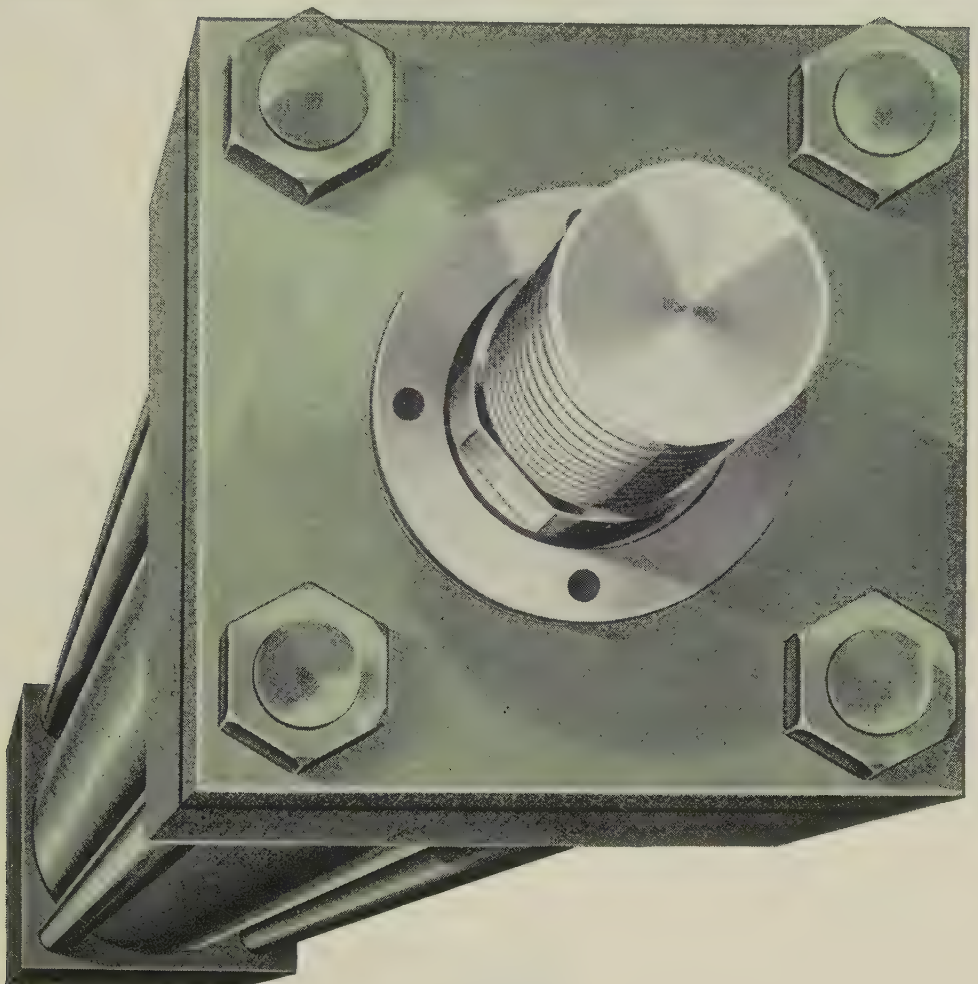
Annealing Furnace

Model F1212-2A is a double pumped, muffle type furnace with a hot zone 6 in. ID and 12 in. long. It can operate continuously at 2150° F or intermittently at 2200° F at a pressure of 1 x 10^{-4} mm of mercury or less.

The vacuum retort and cooling chamber are insulated and water cooled. Installation of a high vacuum, water cooled gate valve between the furnace and the cooling chamber makes semicontinuous operation possible.

The unit can be converted to a melting furnace by removing the

AT YOUR REQUEST...



ANKER-HOLTH

Hydraulic Cylinders now available in Square Head design

Positive Trouble-free Performance

Anker-Holth Division, for 18 years designers and manufacturers of quality air and hydraulic power cylinders, now offers a standard line of all steel, high pressure square head tie rod cylinders. Important new operating features and design achievements assure positive controlled power for a wide range of industrial applications.

Standardized Mountings for Interchangeability

Conservatively rated at 2000 P.S.I. working pressure and 3000 P.S.I. non-shock pressure every cylinder is proof tested at 4500 P.S.I. All mountings are available, standard bores from 1½ to 8 inches. Standardized mountings provide complete interchangeability with most makes of square head cylinders. The Anker-Holth "□" line meets all J.I.C. specifications.

For more information contact your local Anker-Holth representative or Anker-Holth Division, Port Huron, Michigan. YUkon 5-7181

McDOWELL

ANKER-HOLTH DIVISION

THE WELLMAN ENGINEERING COMPANY

2729 CONNOR STREET, PORT HURON, MICH., U. S. A.

horizontal assembly and substituting a spherical melting chamber with a resistance heated furnace containing a crucible for melting 12 lb (steel) up to 3600° F. *Write*: High Vacuum Equipment Corp., 2 Churchill Rd., Hingham, Mass. *Phone*: Hingham 6-2430 (Metal Show Booth 1377)

Furnace Electrodes

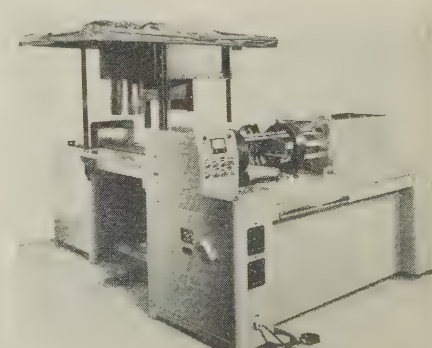
Submerged electrodes that can be removed from and replaced in salt bath furnaces at temperatures of 1350° F are made of noncritical alloys.

There is no lost production time during replacement. Spare casings are not needed, and it is not necessary to tear down and rebuild the tile pot. *Write*: Ajax Electric Co., Frankford Avenue at Delaware Avenue, Philadelphia 23, Pa. *Phone*: Nebraska 4-0548 (Metal Show Booth 1406)

Magnetic Inspection

Magnaflux - Magnaglo ARV-304 is a production unit that handles a wide variety of small steel and iron parts.

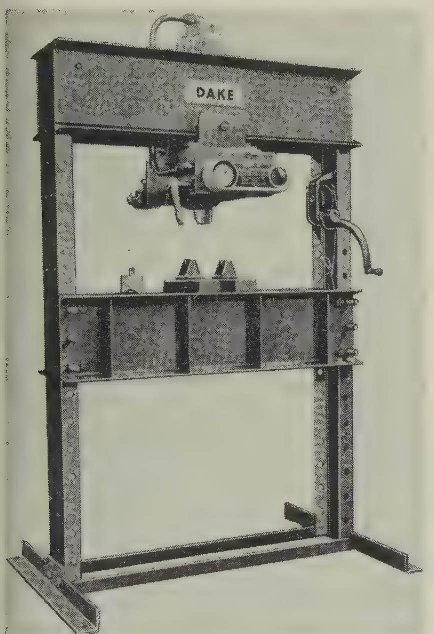
Magnetization may be both circular and longitudinal, simultaneous



or separate, to detect both longitudinal and transverse defects. *Write*: Magnaflux Corp., 7300 W. Lawrence Ave., Chicago 31, Ill. *Phone*: Underhill 7-8000 (Metal Show Booth 1153)

Hydraulic Presses

This line of air operated machines comes in models with capacities of 25, 50, 75, and 150 tons. Bending, straightening, and other press work is done by these machines.



When the control knob is turned, the ram advances at high speed until it comes in contact with the work. It then automatically changes to the power stroke. The knob automatically turns to off position when the hand is removed.

The ram has a 10-in. stroke. *Write*: Dake Corp., Grand Haven, Mich. (Metal Show Booth 960)

Attenuation Comparator

This instrument is used in many laboratory investigations of materials, including hydrogen embrittlement in metals, internal oxidation, nuclear radiation damage, magnetic properties, plastic deformation, and dislocation damping.

A linear circuit presents multiple and comparable echo patterns on an oscilloscope viewing screen. These multiple echos are compared

with a calibrated exponential decay curve which permits direct reading in decibels per microsecond. *Write*: Sperry Products Inc., Danbury, Conn. *Phone*: Pioneer 8-3581 (Metal Show Booth 1053)

Stud Welding Gun

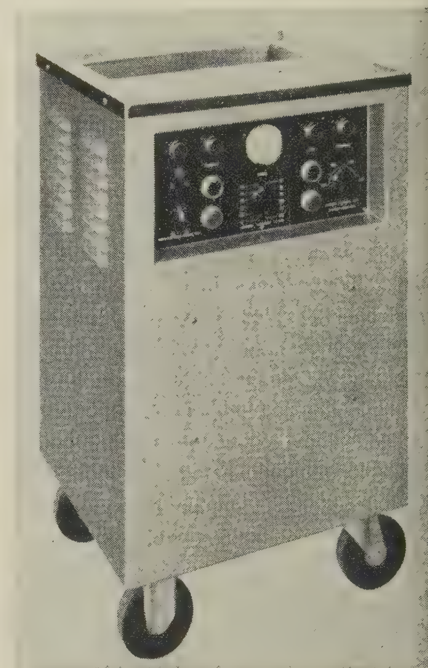
Studs up through ½ in. in diameter can be welded by the NS-10.

The gun, made with durable red plastic, weighs less than 4 lb and is only 9 in. long. *Write*: Nelson Stud Welding Div., Gregory Industries Inc., Lorain, Ohio. *Phone*: Cherry 5-6931 (Metal Show Booth 1476)

Ultrasonic Cleaner

Model R-50 is a self-contained cleaner with a working volume of 5 gal. It can handle alkaline solutions, solvents, and mild acids.

Transducers mounted to the bottom of the unit have a rated input of 250 radio frequency watts average (1 kw peak), which they convert into mechanical vibrations at 38 kilocycles.



This high speed agitation causes cavitation in the liquid, providing a gentle, thorough scrubbing action. *Write*: Branson Ultrasonic Corp., 40 Brown House Rd., Stamford, Conn. *Phone*: Davis 4-6721 (Metal Show Booth 1854)

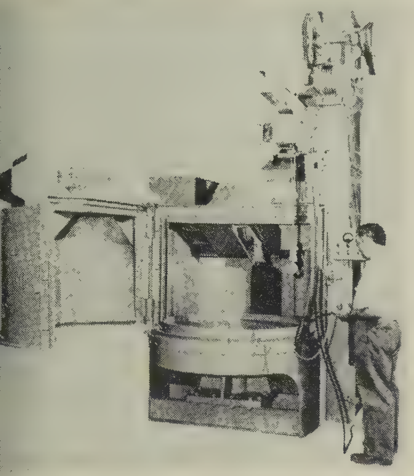
Blast Cleaning

The Rotoblast table room is used for cleaning castings, forgings, and stampings.

It can handle a 4000-lb load up to 48 in. in diameter and 24 in. high.

A cast, labyrinth sealing system makes the cabinet abrasive-tight without the use of rubber gaskets.

The standard table is equipped with a wheel (powered by a 10-hp motor) which will throw 15,000 lb of abrasive an hour. A 15-hp motor is available which will throw



2,000 lb of abrasive an hour. *Write*: Pangborn Corp., Hagerstown, Md. *Phone*: Hagerstown 3500 (Metal Show Booth 1263)

Cleaning Compounds

This nonfoaming, alkaline detergent removes identification inks from aluminum.

Other products: A barrel burnishing compound; a powdered acid scale and rust remover; a solvent acid stripper that removes tough epoxy resins at room temperature; and a zinc phosphating compound for low temperature applications. *Write*: Oakite Products Inc., 134E Rector St., New York 6, N. Y. *Phone*: Whitehall 3-0940 (Metal Show Booth 247)

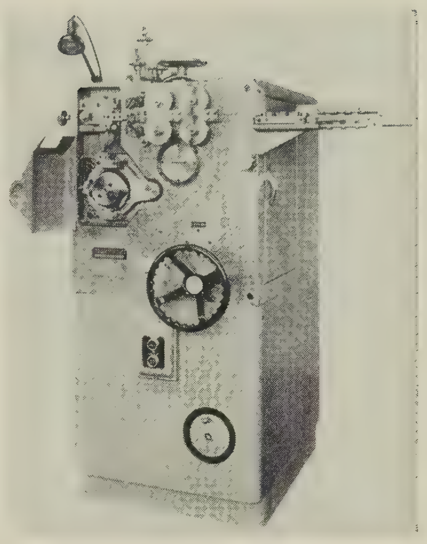
Vacuum Melting Furnace

This induction heated furnace has a crucible capacity of up to 100 lb. It is suited for pilot plant use and the production of small castings. *Write*: F. J. Stokes Corp., 5500 Tabor Rd., Philadelphia 20, Pa. *Phone*: Cumberland 9-0100 (Metal Show Booth 631)

Springmaker

The W-11A Springmaker is easy to set up. Location of controls and simplified design help to combine accuracy and high production.

The torsion attachment is located in a pocket in the front housing.



The clutch is inside the machine. *Write*: Torrington Mfg. Co., Torrington, Conn. (Metal Show Booth 1567)

Overhead Conveyor

Chainveyor is a conveying system that combines vertical up and down curves with horizontal curves.

A combination of power and free

line operation can be used in overhead conveyors. This system uses an automatic cam-action carrier which holds flat materials such as light gage metal sheets. Single loads up to 30 lb can be carried without any danger of marring their surfaces. *Write*: Chainveyor Corp., 5618 E. Washington Blvd., Los Angeles 22, Calif. *Phone*: Raymond 3-4741 (Metal Show Booth 1826)

Hardening Machine

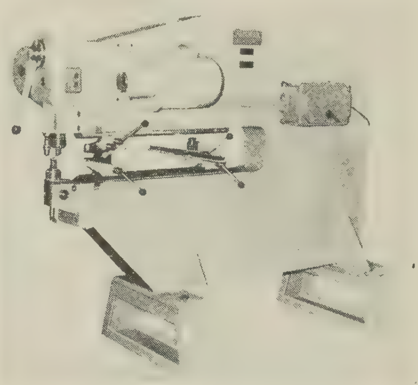
"Building block" type of construction goes into the Flamatic hardening machine.

An electronic temperature control automatically ends the heating cycle and causes the workpiece to be dropped into a quench tank when its surface temperature reaches a preset value. *Write*: Process Machinery Div., Cincinnati Milling Machine Co., Cincinnati 9, Ohio. *Phone*: Redwood 1-2121 (Metal Show Booth 1798)

Machine Works Sheet

Model P-9 does straight, irregular, circle, inside, and slot cutting as well as beading, joggling, edge banding, flanging, dishing, nibbing, and louvering.

Mild steel ⅜ in. thick can be formed.



The machine has a stationary lower tool and a reciprocating upper tool. *Write*: American Pullmax Co. Inc., 2455 N. Sheffield Ave., Chicago 14, Ill. *Phone*: Diversey 8-5727 (Metal Show Booth 1065)

Hardness Tester

Model YR is a motorized Rockwell hardness tester. The semiautomatic unit has a short test cycle, permitting more readings within a definite time period.

A special dial gage makes it unnecessary to set the dial bezel for each test. *Write*: Wilson Mechanical Instrument Div., American Chain & Cable Co. Inc., 230 Park Ave., New York 17, N. Y. *Phone*: Murray Hill 6-8800 (Metal Show Booth 953)

Vacuum Furnace

Type 2721 is a consumable arc cold mold furnace which produces ingots weighing up to 100 lb (in steel). It is a package unit which facilitates installation.

The furnace is used as a production unit for rare metals and as a research unit for steel. *Write*: NRC Equipment Corp., 160 Charlemont St., Newton Highlands 61, Mass. *Phone*: Decatur 2-5800 (Metal Show Booth 1426)

NEW Literature

Write directly to the company for a copy

Low Lift Truck

Electric walkie trucks with lifting capacities of 4000 and 6000 lb are described in this 4-page bulletin, 008-W. Automatic Transportation Co., division of Yale & Towne Mfg. Co., 149 W. 87th St., Chicago 20, Ill.

Dielectric Core Ovens

Bulletin 657, 8 pages, describes a line of ovens using radio frequency power to cure synthetic resin bonded cores quickly. A chart presents engineering data and dimensions of 14 models with rated output capacities of 30 to 200 kw. Dept. 3D, Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.

Coupling Tapping

A machine for the automatic tapping of internal threads of oil tubular couplings (range: 1¼ in. external upset tubing to 6 in. casing) is described in Bulletin E-98, 12 pages. Landis Machine Co., Waynesboro, Pa.

Live Centers

Specifications of standard Morse taper and three types of special live centers are given in this 4-page bulletin. Sturdimatic Tool Co., F Street, Detroit, Mich.

Cutting Tool Research

This 32-page data book is a practical presentation of the use of modern tool materials in production metal turning. Information on ceramics and carbide materials and techniques is included. Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, Ohio.

Carbon Steel Tubing

Advantages of electric resistance welded mechanical tubing are given in Bulletin TB-419, 8 pages. Tubular Products Div., Babcock & Wilcox Co., Beaver Falls, Pa.

Spring Washers

This 6-page bulletin lists more than 1000 sizes of washer dies used for forming ferrous and nonferrous metals. Included are blanking and punching dies for making flat, cupped, curved, wavy, slotted, and belleville spring washers from 0.125 to 4.735 in. OD. Associated Spring Corp., Bristol, Conn.

Machine Tools

Turret lathes and their accessories, automatic lathes, automation units, boring machines, thread and form grinders, and optical comparators are described in this 22-page bulletin, 5713. Advertising Dept., Jones & Lamson Machine Co., Springfield, Vt.

Ductile Iron Valves

This 6-page bulletin describes the advantages of ductile iron and gives specifications on the metal and the valves. Kennedy Valve Mfg. Co., 572 E. Water St., Elmira, N. Y.

Thermocouples

This chart shows color codes and calibration symbols for thermocouples and extension wires. Pyrometer wire resistance figures are listed on the other side. Thermo Electric Co. Inc., Saddle Brook, N. J.

Pinch Jaw Chucks

Automatic chucks for the precision machining of jet engine discs and rings are covered in this 4-page bulletin. Cushman Chuck Co., Hartford 2, Conn.

Grooving Machines

Bulletin 76D, 4 pages, describes hand and power-operated grooving

machines for making single and Pittsburgh lock seams. Niagara Machine & Tool Works, 683 Northland Ave., Buffalo 11, N. Y.

Ball Bearings

This 36-page catalog describes a full range of bearings for use in precision instruments. Topics discussed include starting torque limits, thrust loads, tolerances, fits, lubrication, and top speeds. New Departure Div., General Motors Corp., Bristol, Conn.

Mill Products and Alloys

Extrusions, forgings, and other wrought mill products of aluminum, titanium, and other metals are featured in this 12-page bulletin. Harvey Aluminum Sales Inc., 19200 S. Western Ave., Torrance, Calif.

Stainless Steel

This case history bulletin, P. O. 2157, 20 pages, tells how fabricators improve product design and performance with 17-4 PH and 17-7 PH stainless steel bar and wire. Product Information Service, Armco Steel Corp., Middletown, Ohio.

Titanium Wire and Rod

Tables convert wire diameter sizes (0.002 to 0.200 in.) to linear feet per pound, and round and square bar stock (1/16 to ¾ in.) to pounds per linear foot. Johnston & Funk Titanium Corp., W. Kemrow Avenue, Wooster, Ohio.

Welding

The 1958 edition of the Welding Data Book (TIS 2575A) describes simplified welding procedures for every base metal. The 180-page book covers 120 welding rods, electrodes, and welding compounds. Weld preparation steps are given for all metals. Best torch adjustments and electrode position and manipulation are described. Technical Information Service, Eutectic Welding Alloys Corp., Flushing 58, N. Y.

Tubes for High Temperatures

Bulletin TDC-153B, 4 pages, presents stress rupture data on carbon steel, several alloy steels, and ten stainless steels at 850 to 1800° F. Tubular Products Div., Babcock & Wilcox Co., Beaver Falls, Pa.

Electric Brake

This 36-page design manual, WE[illegible] 6293, describes an electric brake fo[illegible] fail-safe applications. Included is a[illegible] explanation of its operation, selectio[illegible] factors, torque characteristics, an[illegible] controls. Warner Brake & Clutch Co[illegible] Beloit, Wis.

Cutoff Machines

This 4-page bulletin describes ma[illegible]chines for cutting off tubing, pipe and bar stock. Also covered ar[illegible] automatic loaders and hot spinning machines. Modern Machine Tool Co., 2005 Losey St., Jackson, Mich.

Toolroom Grinding

This 28-page bulletin covers th[illegible] grinding of alloy, high speed, and di[illegible] steels. Discussions cover whee[illegible] shapes, wheel symbols and marking[illegible] tool sharpening, and grinding. Mount[illegible]ed wheels are pictured and grading recommendations are included. Carborundum Co., Box 477, Niagara Falls, N. Y.

Castings

Advantages of investment, permanent mold, and centrifugal castings (ferrous and nonferrous) are com-

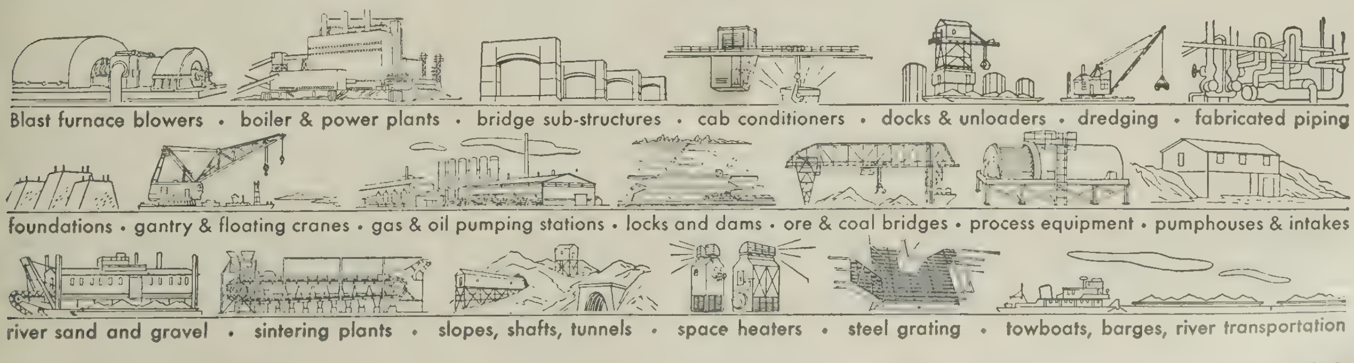
DRAVO-LURGI sinter plants convert iron ore fines to usable form

Two new sinter plants, with a combined annual capacity of over 10,000,000 tons, are being built by Dravo. Each plant will contain three huge sinter machines for processing iron ore fines into clinkers suitable for charging blast furnaces.

Through an exclusive licensing agreement with the Lurgi Company, Europe's foremost builder of sinter machines, Dravo Corporation's extensive engineering and construction facilities are combined with Lurgi's design experience. The new plants now under construction are a result of this combination.

Dravo's engineering and construction skills play an important part in making new processes and techniques available to industry. For information on any of the products or services listed below, write DRAVO CORPORATION, PITTSBURGH 22, PENNSYLVANIA.

DRAVO
CORPORATION



pared in this 4-page bulletin. B-Mold Div., Buckeye Brass & Mfg. Co., 203-213 Central Ave., Mansfield, Ohio.

Regulator Valves

Bulletin J-SC, 4 pages, shows how to size sliding gate valves. Data tell how to adjust sizing for variations in pressure, temperature, viscosity, and specific gravity. Jordan Corp., 6013 Wiehe Rd., Cincinnati 13, Ohio.

Steam Heating Coils

Double - tube steam distributing coils and required selection data are covered in Bulletin B-1418, 8 pages. American Blower Div., American Radiator & Standard Sanitary Corp., Detroit 32, Mich.

X-Ray Spectograph

This 8-page bulletin describes the operation and use of an automatic indexing unit that prints out intensity ratios on 1 to 24 elements of a single sample in a short time. Instruments Div., Philips Electronics Inc., 750 S. Fulton Ave., Mt. Vernon, N. Y.

Collets

Catalog 57, 24 pages, lists dimensions and prices on a line of standard collets, pushers, pads, and accessories. Sheffer Collet Co., Traverse City, Mich.

Speed Reducers

Double reduction units with ratios from 75:1 to 4900:1 are described in a 20-page bulletin, CD-230. Cone-Drive Gears Div., Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.

NEW BOOKS

Industrial pH Handbook, Thomas J. Kehoe, Process Instruments Div., Beckman Instruments Inc., 2500 Fullerton Rd., Fullerton, Calif. 80 pages, $2.

This book reviews industrial pH control systems, their principles, and application engineering and equipment. Use of buffer solutions and pH values are covered.

Handbook of Powered Industrial Trucks, Industrial Truck Association, 900 F St. N. W., Washington 4, D. C. 92 pages, $5.

Sections in this book include industrial truck applications, cost savings through industrial truck handling, planning for and selection of industrial trucks, and engineering data.

Market Outlook

ALTHOUGH steel demand this fall is not as brisk as had been anticipated, indications are consumption is outrunning new orders. Sluggishness is mainly traceable to inventory reductions prompted by freer supply conditions. Volume is expected to at least hold at current demand levels the next couple months.

STOCKS SHRINKING— There is some reason to believe consumers' inventories are being rapidly depleted. New buying, in many cases, is thought to closely approximate current manufacturing requirements. It could mean that many buyers are running the risk of being caught with short supplies.

WARNS OF TROUBLE— A midwestern sheetmaker warns that hand-to-mouth buying could get consumers into trouble quicker than they realize. He says while 15 to 30 day deliveries are available, a slight increase in ordering could extend shipments tremendously. In some instances they could go to six months overnight.

DISAPPOINTING— Automotive demand has been disappointing. And it doesn't look like auto needs will improve much over the next month or so. The situation is adversely affecting buying from other consuming directions, inducing general caution, and freeing supplies that ordinarily would have been taken up.

EXPLANATION— Sluggish automotive business, in part, results from the fact this is the first year in a long time in which the car builders have had access to unlimited steel supplies on a prompt delivery basis. They are able to hold inventories down, ordering to fit needs.

PRODUCTS EASIER— Heavy plate and wide flange structural supplies fall short of demand. But the situation is improving steadily. Both may be fully competitive by yearend. Despite the acceleration of auto assemblies, there is no pinch in cold-rolled sheets; hot-rolled sheets and carbon bars are readily available.

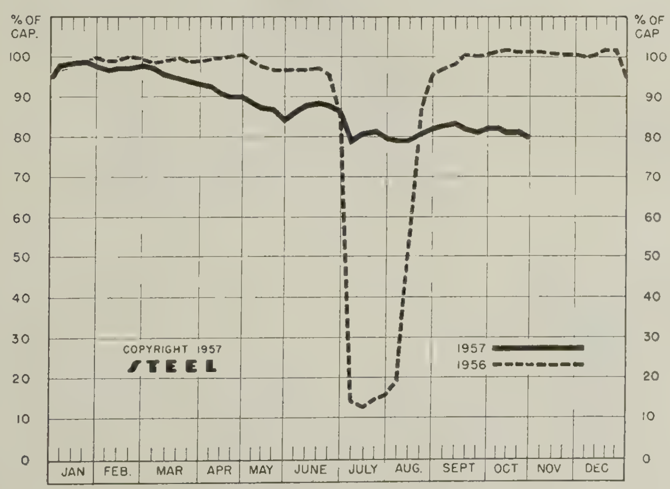
HEAVY GOODS OFF— Some heavy items have eased in recent months. The railroads have not laid rails as extensively this year as originally planned, and freight car programs have tapered with carloadings. Delays in road building reduced bridge and pavement needs and have cut purchases of earthmoving equipment.

PRODUCTION SLIPPING— Steelmaking operations declined 1.5 points last week to 79.5 per cent of national ingot capacity. The rate is equivalent to about 2,035,000 net tons, or 460,000 less than the figure in the like period a year ago. Whether operations are close to bottom is questionable in view of current sluggish demand and general economic uncertainty.

EXPECTED PICKUP—Steel executives expected a sharp rise in post-Labor Day operations. At the Senate price hearing last week, President A. B. Homer of Bethlehem Steel said his company had anticipated close to capacity operations in the fourth quarter. So far it is operating at 91 per cent, with little rise in sight.

SCRAP DECLINING— Pronounced weakness in the scrap market continues. STEEL's composite on No. 1 heavy melting steel has declined for ten consecutive weeks. It dropped another $1 a ton last week to $36.83, a new low since June, 1955. Other price composites are unchanged, with finished steel at $146.03.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

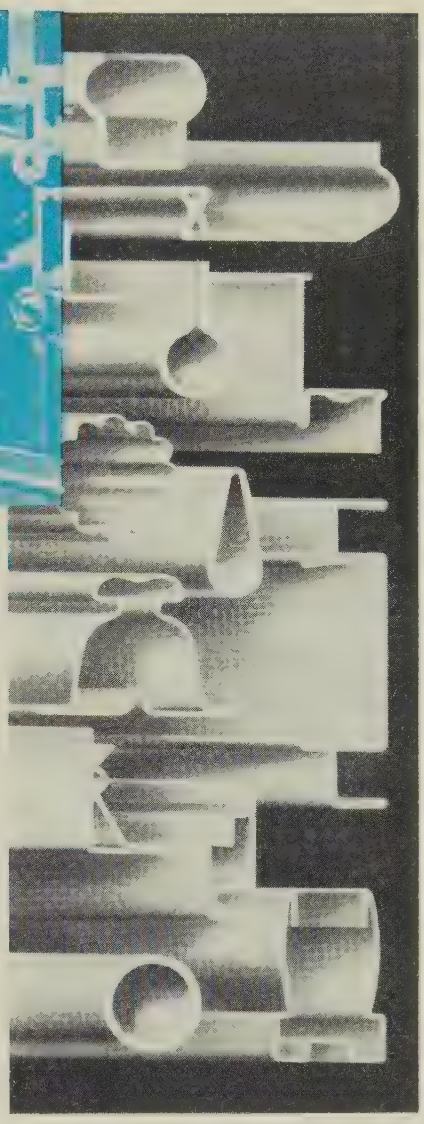
	Week Ended Oct. 27	Change	Same Week 1956	Same Week 1955
Pittsburgh	80.5	+ 0.5*	100.5	104
Chicago	83.5	— 0.5*	102.5	98.5
Mid-Atlantic	81	— 1.5	101	98
Youngstown	65	— 2	102	100
Wheeling	72.5	— 3.5	103.5	100
Cleveland	94.5	+ 6*	107.5	103.5
Buffalo	95	— 2.5	107.5	105
Birmingham	71.5	— 2	95.5	94
New England	50	— 2	85	90
Cincinnati	89	+ 3	100.5	90
St. Louis	94.5	0	94.5	97
Detroit	96	— 3.5*	100	100.5
Western	92	0	105	91
National Rate	79.5	— 1.5	101.5	98

INGOT PRODUCTION‡

	Week Ended Oct. 27	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	127.3†	128.9	131.0	155.1
NET TONS (In thousands)	2,045†	2,070	2,105	2,491

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,559,490 in 1957; 2,461,893 in 1956; 2,413,278 in 1955.

Van Huffel Tube Corp.



Market for Shapes Grows

No contour is too complicated to be made by one of the cold-forming methods. While these shapes still find great use as trim, most applications today are functional

"THE PRODUCT with a thousand shapes" could well be the slogan for producers of cold-rolled shapes, and it might be an understatement at that.

As one sales executive puts it: "We have not found the shape too complicated to make. The only limitation is the size of our equipment."

Evolution—This industry is over 50 years old, but its greatest advances have been made in the last ten years or so. The product is made to order for the myriad of decorative shapes found on everything from automobiles to office machines. But in recent years its functional value has surpassed its decorative use.

The high strength-to-weight ratio of tubular shapes is utilized in many structural applications. One producer of welded tubular shapes says: "For a given cross-sectional area, a tube has many advantages over a solid bar. It is lighter, has good strength and in many cases requires less finishing."

Individual Attention—This is a specialized industry because of the great variety of designs required by its customers. While many of the shapes are standard, literally thousands must be engineered from the ground up. Most producers make their own dies to customer specifications and retain possession of them after the initial run is over. So they have complete control over the product from beginning to end.

Unless the customer gives his written permission, the dies are not used by any other customer. However, the producer does have a stock of hundreds of standard forms for general customer use.

One maker of roller die formed shapes estimates he has 1000 to 1500 separate sets of dies. Another estimates he has over 2000. A producer of welded tubular shapes can make 350 to 400 distinct shapes. And new ones are being designed continually.

From Beds to Plows—The markets for this product have been growing steadily. Harold van Huffel, secretary of Van Huffel Tube Corp., Warren, Ohio, says that in its early days, one of his company's biggest customers was the bed manufacturing industry. "We used to ship tubular bedsteads out of here by the carload. That market is practically gone now, but we serve makers of other metal furniture, transportation equipment, communications equipment, farm implements, appliances, the construction industry, and many others."

One thing that has helped in the development of markets, according to L. C. Colleran, sales manager of Roll Formed Products Co., Youngstown, is the adaptation of secondary operations to the product. It is possible to prenotch, punch, bend, coil, emboss, and otherwise fabricate the shape before the customer takes delivery. This saves him time, money, and equipment.

Range of Metals — The main prerequisite for any material to be formed is ductility. Although commercial quality low carbon steel is the most common metal used, high carbon steel, high strength

steel, stainless steel, aluminum and its alloys, bronze, brass, and copper can be shaped. Both galvanized pipe and sheets can be shaped without marring the surface. And roller die forming is practical on prepainted sheet.

Methods of Production—The two best known methods of forming tubes or shapes are roller die forming and cold drawing through turk's-head dies. In roller forming you start with coiled sheet or strip, and run it through a series of dies which gradually form it into the desired shape (see illustration, Page 259). Depending on the complexity of the shape, anywhere from 2 to 20 stands may be required.

The average production rate is about 100 fpm, so output of 30,000 to 40,000 ft a day is not uncommon. An economical minimum for the production of any one section is about 3500 ft, says one producer. So, the process is not suitable for parts to be made in small quantities. Such items may be more economically formed on a press brake, he adds.

In forming with a turk's-head, a welded tube is fed through the dies designed to produce the desired shape. It is common to use only two or three sets of dies. However, producers point out that several sets must be used in the initial forming of the tube, so that the total number of stands involved is probably equal to that required in roller forming.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 268 & 269

Sheet and strip suppliers depending on the automotive industry for the bulk of their sales are disappointed by the lack of large volume orders.

Everybody has been looking for auto business to lead the sheet market out of its slump. But it hasn't developed, and the feeling is now spreading through the trade that auto tonnage in November will be no better than that in October.

All grades of sheets and strip are available for early delivery. Demand from appliance manufacturers and other consumers shows no signs of increasing.

The American Steel & Wire Div., U. S. Steel Corp., is producing embossed strip with delicate patterns at its Cuyahoga Works, Cleveland. Promising markets include decorative office furniture and equipment, tableware, home appliances, and hardware.

Steel Bars . . .

Bar Prices, Page 267

October sales of hot-rolled bars about equal September's volume. Orders from auto builders for November delivery are moderately improved, but only small tonnages are involved, and these are being offset by a slowing down in demand from miscellaneous consumers.

Cold-drawn bar sales continue in the doldrums. There are no signs of a buying pickup in fourth quarter.

Carbon and alloy bar buying continues slow in New England. One of the largest users in the area, a builder of heavy electrical equipment, reflects current procurement policy of most consum-

ers: Availability and shipments over the next three months will be no problem; forward buying is pointless.

Iron Ore . . .

Iron Ore Prices, Page 274

Shipments of Lake Superior iron ore in the week ended Oct. 21 totaled 2,365,817 tons, reports the American Iron Ore Association. This compares with 2,850,104 tons shipped in the like week a year ago.

Cumulative shipments to Oct. 21 this year were 77,004,737 tons, compared with 63,459,000 tons to the same date last year.

Imports of iron ore in the first seven months this year totaled 17,523,849 gross tons valued at $149,660,349, reports the U. S. Bureau of Mines. Tonnage receipts were as follows:

Source	Tonnage	Value
Brazil	841,891	$11,831,297
British W. Africa	132,146	984,028
Canada	5,946,476	53,031,942
Chile	1,290,133	9,483,825
Cuba	28,538	292,136
Dominican Republic	109,395	1,483,316
Liberia	592,336	5,709,737
Mexico	129,529	390,697
Peru	1,408,586	12,317,516
Sweden	414,478	5,847,970
United Kingdom	339	19,094
Venezuela	6,629,973	48,266,711
West Germany	29	2,080
Totals	17,523,849	$149,660,349

First shipments of Venezuelan iron ore to be received by U. S. Steel Corp.'s Youngstown District plant have been received (65 carloads from Philadelphia). Over 150,000 tons will be stockpiled at the plant over the next ten weeks.

Sells Zirconium Sponge

Commercial grade zirconium sponge is available from Columbia-National Corp., Cambridge, Mass. The company (jointly owned by Columbia-Southern Chemical Corp. and National Research Corp.) recently made its first shipment from its plant in Santa Rosa County, Fla. The sale was to a leading producer of special alloy products.

Blast Furnace Output Up

Blast furnace production totaled 6,627,911 net tons in September, reports the American Iron & Steel Institute. Of the total, 6,569,074 tons were pig iron, 58,837 tons were ferromanganese and spiegeleisen. In September a year ago, output was: 6,873,064 tons of pig iron, 59,584 tons of ferroalloys.

Output in the first nine months this year totaled 61,760,634 gross tons (61,178,395 pig iron, 582,239 ferroalloys). This compares with 54,264,932 tons (53,794,955 pig iron, 469,977 ferroalloys), produced in the like period of last year. Comparative data are given in the following table:

BLAST FURNACE PRODUCTION BY DISTRICTS
(9 Months; Net tons)

Districts	Pig Iron 1957	Pig Iron 1956	Ferromanganese & Spiegel 1957	Ferromanganese & Spiegel 1956
Eastern	13,008,014	11,138,178	263,778	229,243
Pittsburgh-Youngstown	20,598,048	18,825,194	203,963	146,535
Cleveland-Detroit	7,427,283	6,458,234	....	....
Chicago	12,422,127	10,972,270	....	....
Southern	4,705,212	3,561,003	114,498	94,199
Western	3,017,711	2,840,076	....	....
Totals	61,178,395	53,794,955	582,239	469,977

Tubular Goods . . .

Tubular Goods Prices, Page 271

Sales of most tubular products are declining, but producers of line pipe and oil country goods expect to sell their entire fourth quarter production. Standard pipe and mechanical tubing are moving slowly. Only a little more activity is reported in pressure tubing.

Sellers of oil country goods report that carbon steel tubing is readily available, but that a shortage of high-strength alloy tubing continues.

Smaller buyers of oil country goods are reducing inventories, but major users in the Southwest are expected to maintain stocks at about present levels.

Plates . . .

Plate Prices, Page 267

Stringency in sheared plate supply continues. Producers are behind on commitments. One eastern mill is considering blanking out a month's production to enable it to catch up on arrearages, though the over-all market situation is less pressing than it was some weeks ago.

Easing continues in universal, strip plates, and light sheared plates. Supply and demand are in closer balance.

Major outlets include the oil and gas industry, shipbuilding, and construction, but activity in those groups is leveling out. There is also some easing in railroad equipment and industrial machinery requirements.

Warehouse . . .

Warehouse Prices, Page 272

The usual fall upswing in distributors' bookings has failed to materialize, although trading is fairly active at some points. Some orders being booked are for immediate use. (Spot delivery is specified.) The consensus is that improvement is likely to develop next month.

Stocks of plates and structural shapes are increasing. Bars and merchant pipe are moving slowly, while flat-rolled products are generally in fair demand. No significant gain is noted in sales to automotive suppliers.

While price schedules remain firm in the Seattle area, low quotations quoted by Portland interests on some items continue to harass Seattle distributors in the overlapping territory.

Wire . . .

Wire Prices, Pages 269 & 270

Manufacturers wire sales are improving slightly from low third quarter levels due to a gain on automotive account. Such products as bead wire, used in making tires, are in better demand.

Several other consuming lines have increased buying, having completed inventory reductions. Orders are being placed on short leadtime, and the market is highly competitive.

Merchant wire sales are declining seasonally.

Structural Shapes . . .

Structural Shape Prices, Page 267

Structural steel demand continues to slide. Industrial and commercial inquiry is off, and public work, including bridges, schools, and institutional construction, is lighter.

Fabricators' backlogs are declining, and some shops have openings in schedules which make for more competitive prices.

There continues to be a shortage of heavy wide flange shapes —16 in. and up for column sections, 24 in. and up for beams. One maker of large sections is behind 70 days on commitments, another 45 to 60 days.

Less wide flange tonnage is coming out for structural work being estimated in New England. The bulk of current demand is for bridges, with requirements falling below those in first half.

Pig Iron . . .

Pig Iron Prices, Page 272

The lag in merchant iron business continues. Expected fall buoyancy has not developed, and some sellers say the trend is downward. They are not optimistic over prospects for the remainder of the year.

Gray iron foundries have scant order backlogs for castings and are booking a shrinking volume of new business. They report that

buyers of castings in the building product and machinery fields have reduced their purchases.

Many blast furnace operators are stockpiling iron, and some plan to curtail operations during the winter.

Semifinished Steel . . .

Semifinished Prices, Page 267

Four open hearth furnaces have been taken out of production in the No. 2 shop at the Pittsburgh Works of Jones & Laughlin Steel Corp. Each furnace has a rated capacity of 220 tons per heat; the annual capacity of the four is 476,000 tons.

Republic Steel Corp. is putting two new electric furnaces and a strip mill into operation at Gadsden, Ala. Republic's eight open hearth furnaces in the area have ingot steel capacity of 789,000 tons annually. The new furnaces will add 408,000 tons.

The Gadsden expansion is part of Republic's company-wide program to increase its ingot capacity by 2 million tons, bringing its total to 12,240,000. The new Gadsden facilities will be dedicated formally Oct. 30.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

2000 tons, wood pulp mill, Bowaters-Carolinas Corp., Catawba, S. C., to B. L. Montague Co., Sumter, S. C.; Daniel Construction Co., Greenville, S. C., general contractor.

1900 tons, terminal building and west pier, Moisant International Airport, New Orleans, to Orleans Material & Equipment Co., New Orleans; J. A. Jones Construction Co., Shreveport, La., general contractor.

1160 tons, state bridge work, Lehigh County, Pennsylvania, through James D. Morrissey, general contractor, to Mayer Pollock, Pottstown, Pa.; award has been pending some time.

1140 tons, transit sheds and piers, Mobile, Ala., to Hartley Boiler Works, Montgomery, Ala.; Blount Bros. Construction Co., Montgomery, general contractor.

730 tons, plant addition, Bendix Aviation Corp., Mishawaka, Ind., to Fort Wayne Structural Steel Co., Ft. Wayne, Ind. (direct); Sollitt Construction Co., South Bend, Ind., general contractor; 75 tons of reinforcing steel, Nelson Engineering Sales Inc.

705 tons, state highway bridge, Richmond, Va., to Richmond Steel Co. Inc., Richmond; W. E. Graham & Sons, Cleveland, N. C., general contractor.

350 tons, science building, Clemson College, Clemson, S. C., to Kline Iron & Steel Co., Columbia, S. C.; Boyle Construction Co., Sumter, S. C., general contractor; 85 tons of reinforcing steel, Southern Engineering Co., Charlotte, N. C.

300 tons, state bridge work, Lehigh County, Pennsylvania, to Lehigh Structural Steel Co., Allentown, Pa.

200 tons, Sunset Junior High School, Seattle, to Leckenby Structural Steel Co., Seattle.

150 tons, chemistry building, University of Colorado, Boulder, Colo., to United Steel & Iron Works, Denver; Mead & Mount, Denver, general contractor.

STRUCTURAL STEEL PENDING

1875 tons, Washington State, Hood Canal floating bridge; Morrison Knudsen Co., Puget Sound Bridge & Dredging Co., General Construction Co., Seattle, and Henry J. Kaiser Co., Oakland, Calif., low joint bid at $14,226,690.

936 tons, state bridge work, Manahawkin Bay, Ocean County, New Jersey, bids Nov. 7.

935 tons, three trestle structures, Manahawkin Bay, Stafford-Ship Bottom, Ocean County, New Jersey; bids Nov. 7, Trenton, N. J.

500 tons or more, remodeling four Washington State ferries; Pacific Car & Foundry Co., Seattle, low at $1,211,252.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1200 tons, wood pulp mill, Bowaters-Carolinas Corp., Catawba, S. C., to Joseph Fox Co., Birmingham; Daniel Construction Co., Greenville, S. C., is general contractor.

785 tons, chemistry and animal science building, University of Georgia, Athens, Ga., to Hall Steel Co., Atlanta; H. W. Ivey Construction Co., Atlanta, general contractor.

510 tons, terminal building and west pier, Moisant International Airport, New Orleans, to Mississippi Steel Corp., New Orleans; J. A. Jones Construction Co., Shreveport, La., general contractor.

375 tons, transit sheds and piers, Mobile, Ala., to Conners Steel Div., H. K. Porter Company Inc., Birmingham; Blount Bros. Construction Co., Montgomery, Ala., general contractor.

325 tons, reinforcing and structurals, high school, Madison, N. J., to Igoe Bros. Inc., Newark, N. J. (bars), and Schmidt Iron Works, Passaic, N. J. (structurals); Thomas Construction Co. Inc., Paterson, N. J., general contractor.

315 tons, chemistry building, University of Colorado, Boulder, Colo., to Colorado Builders Supply Co., Denver; Mead & Mount, Denver, general contractor.

260 tons, high school, Herkimer, N. Y., to Whitlaine Construction Specialties Inc., Binghamton, N. Y.; Vincent J. Smith Inc., Binghamton, general contractor; 70 tons of structural steel to Bethlehem Contracting Co., Bethlehem, Pa.

230 tons, three-span plate girder bridge, Merrimack River, Concord, N. H., to the Bancroft & Martin Rolling Mills Co., South Portland, Maine; Monroe-Langstroth Inc., Norwood, Mass., general contractor; 515 tons of bearing piles, Bethlehem Steel Co., Bethlehem, Pa.; 1355 tons of fabricated structural steel to American Bridge Div., U. S. Steel Corp., Pittsburgh.

195 tons, state highway bridge, Richmond, Va., to Virginia Steel Co., Richmond; W. E. Graham & Sons, Cleveland, N. C., general contractor.

REINFORCING BARS PENDING

6300 tons, Washington State Hood Canal floating bridge; bids in.

455 tons, also prestressed girders, 24 steel piles, etc., Seattle Ballard Bridge grade separation, bids Nov. 13.

450 tons, three trestle structures, Manahawkin Bay, Stafford-Ship Bottom, Ocean County, New Jersey; bids Nov. 7, Trenton, N. J.

PLATES . . .

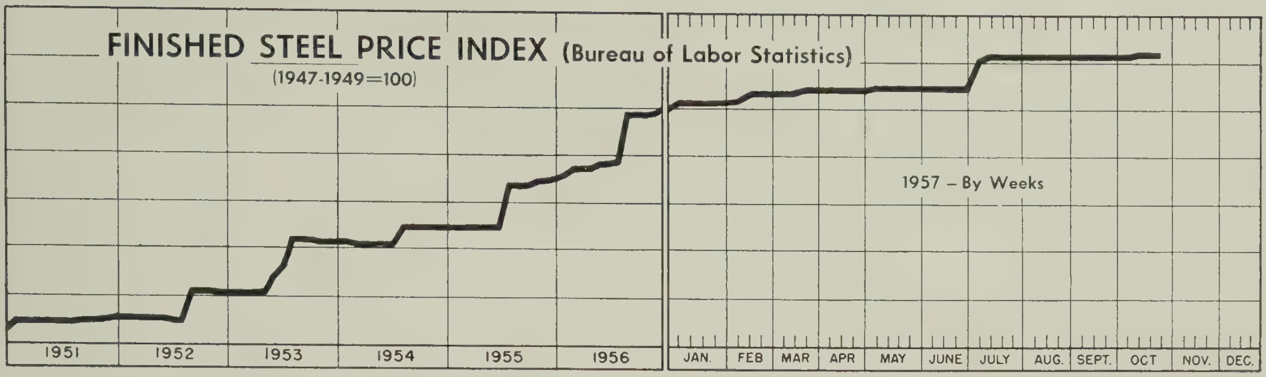
PLATES PENDING

1500 tons, also 1000 tons of shapes, two Washington State ferries; Puget Sound Bridge & Dredging Co., Seattle, low at $4,288,000.

300 tons, including shapes, 18,000-bbl. coast tanker for Standard Oil Co. of California; general contract to Albina Engine & Machine Works, Portland, Oreg.

100 tons plus, 200,000-gal elevated steel water tank; bids to King County District No. 75, Seattle, Oct. 30.

Price Indexes and Composites



Oct. 22, 1957	Week Ago	Month Ago	Oct. Avg.	Year Ago
181.7	**181.7**	**181.5**	**181.7**	**168.6**

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Oct. 22

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1 ...	$5.600
Rails, Light, 40 lb	7.067
Tie Plates	6.600
Axles, Railway	9.825
Wheels, Freight Car, 33 in. (per wheel)	60.000
Plates, Carbon	6.150
Structural Shapes	5.942
Bars, Tool Steel, Carbon (lb)	0.535
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)....	0.650
Bars, Tool Steel, H.R., Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.355
Bars, Tool Steel, H.R. Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.850
Bars, H.R., Alloy	10.525
Bars, H.R., Stainless, 303 (lb)	0.525
Bars, H.R., Carbon	6.425
Bars, Reinforcing	6.210
Bars, C.F., Carbon	10.360
Bars, C.F., Alloy	13.875
Bars, C.F., Stainless, 302 (lb)	0.553
Sheets, H.R., Carbon	6.192
Sheets, C.R., Carbon....	7.089
Sheets, Galvanized	8.220
Sheets, C.R., Stainless, 302 (lb)	0.688
Sheets, Electrical	12.025
Strip, C.R., Carbon	9.243
Strip, C.R., Stainless, 430 (lb)	0.493
Strip, H.R., Carbon	6.245
Pipe, Black, Buttweld (100 ft)	19.814
Pipe, Galv., Buttweld (100 ft)	23.264
Pipe, Line (100 ft)	199.023
Casing, Oil Well, Carbon (100 ft	194.499
Casing, Oil Well, Alloy (100 ft)	304.610
Tubes, Boiler (100 ft) ..	49.130
Tubing, Mechanical, Carbon (100 ft)	24.953
Tubing, Mechanical, Stainless, 304 (100 ft)	205.608
Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)....	9.783
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.483
Black Plate, Canmaking Quality (95 lb base box)	7.583
Wire, Drawn, Carbon ...	10.225
Wire, Drawn, Stainless, 430 (lb)	0.653
Bale Ties (bundles)	7.967
Nails, Wire, 8d Common.	9.828
Wire, Barbed (80-rod spool)	8.719
Woven Wire Fence (20-rod roll)	21.737

STEEL's FINISHED STEEL PRICE INDEX*

	Oct. 23 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100) ...	239.15	239.15	239.15	225.58	181.31
Index in cents per lb	6.479	6.479	6.479	6.111	4.912

STEEL's ARITHMETICAL PRICE COMPOSITES*

Finished Steel, NT	$146.03	$146.03	$146.19	$137.48	$110.98
No. 2 Fdry Pig Iron, GT..	66.49	66.49	66.49	62.63	55.04
Basic Pig Iron, GT	65.99	65.99	65.99	62.18	54.66
Malleable Pig Iron, GT ...	67.27	67.27	67.27	63.41	55.77
Steelmaking Scrap, GT ...	36.83	37.83	46.33	57.00	43.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point

FINISHED STEEL

	Oct. 23 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.425	5.425	5.425	5.075	3.95
Bars, H.R., Chicago	5.425	5.425	5.425	5.075	3.95
Bars, H.R., deld., Philadelphia	5.725	5.725	5.725	4.93	4.502
Bars, C.F., Pittsburgh	7.30*	7.30*	7.30*	6.85*	4.925
Shapes, Std., Pittsburgh ...	5.275	5.275	5.275	5.00	3.85
Shapes, Std., Chicago	5.275	5.275	5.275	5.00	3.85
Shapes, deld., Philadelphia..	5.545	5.545	5.545	5.00	4.13
Plates, Pittsburgh	5.10	5.10	5.10	4.85	3.90
Plates, Chicago	5.10	5.10	5.10	4.85	3.90
Plates, Coatesville, Pa.	5.10	5.10	5.50	5.25	4.35
Plates, Sparrows Point, Md.	5.10	5.10	5.10	4.85	3.90
Plates, Claymont, Del.	5.70	5.70	5.70	5.35	4.35
Sheets, H.R., Pittsburgh ...	4.925	4.925	4.925	4.675	3.775
Sheets, H.R., Chicago	4.925	4.925	4.925	4.675	3.775
Sheets, C.R., Pittsburgh ...	6.05	6.05	6.05	5.75	4.575
Sheets, C.R., Chicago	6.05	6.05	6.05	5.75	4.575
Sheets, C.R., Detroit	6.05-6.15	6.05-6.15	6.05-6.15	5.75-5.85	4.775
Sheets, Galv., Pittsburgh ..	6.60	6.60	6.60	6.30	5.075
Strip, H.R., Pittsburgh	4.925	4.925	4.925	4.675	3.75-4.225
Strip, H.R., Chicago	4.925	4.925	4.925	4.675	3.725
Strip, C.R., Pittsburgh	7.15	7.15	7.15	6.85	5.10-5.80
Strip, C.R., Chicago	7.15	7.15	7.15	6.85	5.35
Strip, C.R., Detroit	7.25	7.25	7.25	6.95	5.30-6.05
Wire, Basic, Pittsburgh ...	7.65	7.65	7.65	7.20	5.10-5.225
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.20	6.20-6.35
Tin plate (1.50 lb) box, Pitts.	$10.30	$10.30	$10.30	$9.85	$8.95

*Including 0.35c for special quality.

SEMIFINISHED STEEL

Billets, forging, Pitts. (NT)	$96.00	$96.00	$96.00	$91.50	$70.50
Wire rods, $\frac{7}{32}$-⅜" Pitts. ...	6.15	6.15	6.15	5.80	4.325

PIG IRON, Gross Ton

	Oct. 23 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pitts.	$67.00	$67.00	$67.00	$63.50	$55.50
Basic, Valley	66.00	66.00	66.00	62.50	54.50
Basic, deld., Phila.	70.01	70.01	70.01	66.26	59.25
No. 2 Fdry, NevilleIsland,Pa.	66.50	66.50	66.50	63.00	55.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	63.00	55.00
No. 2 Fdry, deld., Phila. .	70.51	70.51	70.51	66.76	59.75
No. 2 Fdry, Birm.	62.50	62.50	62.50	59.00	51.38
No. 2 Fdry(Birm.)deld.Cin.	70.20	70.20	70.20	66.70	58.93
Malleable, Valley	66.50	66.50	66.50	63.00	55.00
Malleable, Chicago	66.50	66.50	66.50	63.00	55.00
Ferromanganese, Duquesne.	245.00†	245.00†	255.00†	235.00†	228.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pittsburgh	$37.50	$38.50	$48.50	$55.50	$44.00
No. 1 Heavy Melt., E. Pa. .	38.00	37.50	43.00	57.50	41.50
No. 1 Heavy Melt, Chicago.	35.00	37.50	47.50	58.00	42.50
No. 1 Heavy Melt, Valley..	35.50	36.50	43.50	63.50	44.00
No. 1 Heavy Melt, Cleve. ..	32.50	34.50	39.50	61.50	43.00
No. 1 Heavy Melt, Buffalo.	36.50	38.50	47.50	57.50	43.00
Rails, Rerolling, Chicago ..	52.50	55.50	63.50	84.00	52.50
No. 1 Cast, Chicago	35.50	38.50	41.50	50.50	50.00

COKE, Net Ton

Beehive, Furn., Connlsvl. ..	$15.25	$15.25	$15.25	$14.50	$14.75
Beehive, Fdry., Connlsvl. ..	18.25	18.25	18.25	17.50	17.00

Tension . . . by the ton!

While the air-powered Signode stretcher holds the strapping at its one-ton tension, the workman crimps the seal with a Signode air-powered sealer. The seal, the strap—and the tension—will hold, to keep this 4900-pound bundle of steel bars tight and secure to destination. What material other than steel strapping could do this job, could take and hold this tension, would cost so little, could be applied with air power to do the hard work fast? This hefty bundle is a good example of how—and why—Signode can make your product cost less to handle, store, ship and receive. To be specific, call your Signode man, or write:

SIGNODE STEEL STRAPPING CO.

2645 N. Western Avenue, Chicago 47, Illinois

Offices Coast to Coast. Foreign Subsidiaries and Distributors World-Wide.
In Canada: Canadian Steel Strapping Co., Ltd., Montreal • Toronto

Steel Prices

Mill prices as reported to STEEL, Oct. 23, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers, page 268; to footnotes, page 270.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 .....$73.50

INGOTS, Alloy (NT)
Detroit S41 ....$77.00
Farrell,Pa. S3 ....77.00
Lowellville,O. S3 ......77.00
Midland,Pa. C18 ......77.00
Munhall,Pa. U5 ....77.00
Sharon,Pa. S3 ....77.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 ....$77.50
Bridgeport,Conn. N19 ..80.50
Buffalo R2 ....77.50
Clairton,Pa. U5 ......77.50
Ensley,Ala. T2 ......77.50
Fairfield,Ala. T2 .....77.50
Fontana,Calif. K1 ....88.00
Gary,Ind. U5 ....77.50
Johnstown,Pa. B2 .....77.50
Lackawanna,N.Y. B2..77.50
Munhall,Pa. U5 ......77.50
S.Chicago,Ill. R2, U5..77.50
S.Duquesne,Pa. U5 ....77.50
Sterling,Ill. N15 ......77.50
Youngstown R2 ......77.50

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$96.00
Bridgeport,Conn. N19.101.00
Buffalo R2 ....96.00
Canton,O. R2 ....98.50
Clairton,Pa. U5 ....96.00
Conshohocken,Pa. A3.101.00
Ensley,Ala. T2 ....96.00
Fairfield,Ala. T2 .....96.00
Fontana,Calif. K1 ..105.50
Gary,Ind. U5 ....96.00
Geneva,Utah C11 .....96.00
Houston S5 ....101.00
Johnstown,Pa. B2 ....96.00
Lackawanna,N.Y. B2..96.00
LosAngeles B3 ......105.50
Midland,Pa. C18 .....96.00
Munhall,Pa. U5 ......96.00
Seattle B3 ....109.50
Sharon,Pa. S3 ....96.00
S.Chicago R2,U5,W14..96.00
S.Duquesne,Pa. U5 ...96.00
S.SanFrancisco B3 ...105.50
Warren,O. C17 ....96.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..$114.00
Bridgeport,Conn. N19.114.00
Buffalo R2 ....114.00
Canton,O. R2, T7 ....114.00
Conshohocken,Pa. A3..121.00
Detroit S41 ....114.00
Economy,Pa. B14 ....114.00
Farrell,Pa. S3 ....114.00
Fontana,Calif. K1 ....135.00
Gary,Ind. U5 ....114.00
Houston S5 ....119.00
Ind.Harbor,Ind. Y1 ..114.00
Johnstown,Pa. B2 ....114.00
Lackawanna,N.Y. B2.114.00
LosAngeles B3 ......134.00
Lowellville,O. S3 ....114.00
Massillon,O. R2 .....114.00
Midland,Pa. C18 .....114.00
Munhall,Pa. U5 ......114.00
Sharon,Pa. S3 ....114.00
S.Chicago R2,U5,W14.114.00
S.Duquesne,Pa. U5 ...114.00
Struthers,O. Y1 .....114.00
Warren,O. C17 ......114.00

ROUNDS, SEAMLESS TUBE (NT)
Bridgeport,Conn. N19 $122.50
Buffalo R2 ....117.50
Canton,O. R2 ....120.00
Cleveland,O. R2 .....117.50
Gary,Ind. U5 ....117.50
S.Chicago,Ill. R2, W14 117.50
S.Duquesne,Pa. U5 ...117.50
Warren,O. C17 ......117.50

SKELP
Aliquippa,Pa. J5 ....5.075
Munhall,Pa. U5 ......4.875
Warren,O. R2 ....4.875
Youngstown R2, U5 ..4.875

WIRE RODS
AlabamaCity,Ala. R2 ..6.15
Aliquippa,Pa. J5 .....6.15
Alton,Ill. L1 ....6.35
Buffalo W12 ....6.15
Cleveland A7 ....6.15
Donora,Pa. A7 ....6.15
Fairfield,Ala. T2 ......6.15
Houston S5 ....6.40
IndianaHarbor,Ind. Y1..6.15
Johnstown,Pa. B2 .....6.15
Joliet,Ill. A7 ....6.15
KansasCity,Mo. S5 ....6.40
Kokomo,Ind. C16 .....6.25
LosAngeles B3 ....6.95
Minnequa,Colo. C10 ....6.40
Monessen,Pa. P17 .....6.15
N.Tonawanda,N.Y. B11.6.15
Pittsburg,Calif. C11 ....6.95
Portsmouth,O. P12 ....6.15
Roebling,N.J. R5 ......6.25
S.Chicago,Ill. R2 ......6.15
SparrowsPoint,Md. B2 ..6.25
Sterling,Ill. (1) N15 ....6.15
Sterling,Ill. N15 ....6.25
Struthers,O. Y1 ....6.15
Worcester,Mass. A7 ....6.45

STRUCTURALS

Carbon Steel Std. Shapes
Ala.City,Ala. R2 ....5.275
Atlanta A11 ....5.475
Aliquippa,Pa. J5 ....5.275
Bessemer,Ala. T2 ....5.275
Bethlehem,Pa. B2 ....5.325
Birmingham C15 .....5.275
Clairton,Pa. U5 ......5.275
Fairfield,Ala. T2 ......5.275
Fontana,Calif. K1 ....6.075
Gary,Ind. U5 ....5.275
Geneva,Utah C11 .....5.275
Houston S5 ....5.375
Ind.Harbor,Ind. I-2 ...5.275
Johnstown,Pa. B2 ....5.325
Joliet,Ill. P22 ....5.275
KansasCity,Mo. S5 ....5.375
Lackawanna,N.Y. B2..5.325
LosAngeles B3 ....5.975
Minnequa,Colo. C10 ..5.575
Munhall,Pa. U5 ....5.275
Niles,Calif. P1 ....5.925
Phoenixville,Pa. P4 ..5.325
Portland,Oreg. O4 ....6.025
Seattle B3 ....6.025
S.Chicago,Ill. U5, W14.5.275
S.SanFrancisco B3 ....5.925
Sterling,Ill. N15 ......5.275
Torrance,Calif. C11 ..5.975
Weirton,W.Va. W6 ...5.275

Wide Flange
Bethlehem,Pa. B2 ....5.325
Clairton,Pa. U5 ......5.275
Fontana,Calif. K1 ....6.225
IndianaHarbor,Ind. I-2.5.525
Lackawanna,N.Y. B2..5.325
Munhall,Pa. U5 ....5.275
Phoenixville,Pa. P4 ..5.325
S.Chicago,Ill. U5 .....5.275

Alloy Std. Shapes
Aliquippa,Pa. J5 ......6.55
Clairton,Pa. U5 ....6.55
Gary,Ind. U5 ....6.55
Houston S5 ....6.65
KansasCity,Mo. S5 ....6.65
Munhall,Pa. U5 ....6.55
S.Chicago,Ill. U5 .....6.55

H.S., L.A. Std. Shapes
Aliquippa,Pa. J5 ....7.75
Bessemer,Ala. T2 ......7.75
Bethlehem,Pa. B2 ......7.80
Clairton,Pa. U5 ....7.75
Fairfield,Ala. T2 ....7.75
Fontana,Calif. K1 .....8.55
Gary,Ind. U5 ....7.75
Geneva,Utah C11 ......7.75
Houston S5 ....7.85
Ind.Harbor,Ind. I-2, Y1 7.75
Johnstown,Pa. B2 .....7.80
KansasCity,Mo. S5 ....7.85
Lackawanna,N.Y. B2 ..7.80
LosAngeles B3 ....8.45
Munhall,Pa. U5 ....7.75
Seattle B3 ....8.50
S.Chicago,Ill. U5, W14..7.75
S.SanFrancisco B3 .....8.40
Struthers,O. Y1 ....7.75

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 ......7.80
Lackawanna,N.Y. B2 ..7.80
Munhall,Pa. U5 ....7.75
S.Chicago,Ill. U5 ....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 ....5.325
Lackawanna,N.Y. B2..5.325
Munhall,Pa. U5 ....5.275
S.Chicago,Ill. U5 .....5.275

STEEL SHEET PILING
Lackawanna,N.Y. B2 ..6.225
Munhall,Pa. U5 ....6.225
S.Chicago,Ill. U5 .....6.225

PLATES

PLATES, Carbon Steel
Ala.City,Ala. R2 ......5.10
Aliquippa,Pa. J5 ......5.10
Ashland,Ky. (15) A10 ..5.10
Bessemer,Ala. T2 ......5.10
Clairton,Pa. U5 ....5.10
Claymont,Del. C22 .....5.70
Cleveland J5, R2 .....5.20
Coatesville,Pa. L7 .....5.10
Conshohocken,Pa. A3 ..5.20
Ecorse,Mich. G5 ....5.20
Fairfield,Ala. T2 ....5.10
Fontana,Calif. (30) K1 .5.90
Gary,Ind. U5 ....5.10
Geneva,Utah C11 ......5.10
GraniteCity,Ill. G4 .....5.30
Harrisburg,Pa. P4 ....5.80
Houston S5 ....5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Johnstown,Pa. B2 .....5.10
Lackawanna,N.Y. B2 ..5.10
LoneStar,Tex. L6 ......5.45
Mansfield,O. E6 ....5.10
Minnequa,Colo. C10 ....5.95
Munhall,Pa. U5 ....5.10
Newport,Ky. A2 ....5.10
Pittsburgh J5 ....5.10
Riverdale,Ill. A1 ....5.10
Seattle B3 ....6.00
Sharon,Pa. S3 ....5.10
S.Chicago,Ill. U5, W14 5.10
SparrowsPoint,Md. B2 ..5.10
Sterling,Ill. N15 ....5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 ....5.10
Youngstown R2, U5, Y1.5.10

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 .....7.35
Fontana,Calif. K1 .....7.55
Geneva,Utah C11 ......6.75
Houston S5 ....6.85
Johnstown,Pa. B2 .....6.75
SparrowsPoint,Md. B2 ..6.75

PLATES, Wrought Iron
Economy,Pa. B14 .....13.15

PLATES, H.S., L.A.
Aliquippa,Pa. J5 .....7.625
Bessemer,Ala. T2 ....7.625
Clairton,Pa. U5 ......7.625
Claymont,Del. C22 ....7.625
Cleveland J5, R2 .....7.625
Coatesville,Pa. L7 ....7.925
Conshohocken,Pa. A3 ..7.625
Economy,Pa. B14 ....7.625
Ecorse,Mich. G5 .....7.725
Fairfield,Ala. T2 .....7.625
Farrell,Pa. S3 ....7.625
Fontana,Calif.(30) K1 .8.425
Gary,Ind. U5 ....7.625
Geneva,Utah C11 ....7.625
Houston S5 ....7.725
Ind.Harbor,Ind. I-2, Y1 7.625
Johnstown,Pa. B2 ....7.625
Munhall,Pa. U5 ....7.625
Pittsburgh J5 ....7.625
Seattle B3 ....8.525
Sharon,Pa. S3 ....7.625
S.Chicago,Ill. U5, W14 7.625
SparrowsPoint,Md. B2..7.625
Warren,O. R2 ....7.625
Youngstown U5 ....7.625

PLATES, ALLOY
Aliquippa,Pa. J5 ......7.20
Claymont,Del. C22 .....7.20
Coatesville,Pa. L7 .....7.20
Economy,Pa. B14 ......7.20
Farrell,Pa. S3 ....7.20
Fontana,Calif.(30) K1 ..8.00
Gary,Ind. U5 ....7.20
Houston S5 ....7.30
Ind.Harbor,Ind. Y1 ....7.20
Johnstown,Pa. B2 .....7.20
Lowellville,O. S3 ......7.20
Munhall,Pa. U5 ....7.20
Newport,Ky. A2 ....7.20
Pittsburgh J5 ....7.20
Seattle B3 ....8.10
Sharon,Pa. S3 ....7.20
S.Chicago,Ill. U5, W14..7.20
SparrowsPoint,Md. B2 ..7.20
Youngstown Y1 ....7.20

FLOOR PLATES
Cleveland J5 ....6.175
Conshohocken,Pa. A3 ..6.175
Ind.Harbor,Ind. I-2....6.175
Munhall,Pa. U5 ......6.175
S.Chicago,Ill. U5 .....6.175

PLATES, Ingot Iron
Ashland c.l. (15) A10..5.35
Ashland l.c.l. (15) A10..5.85
Cleveland c.l. R2 ......5.85
Warren,O. c.l. R2 ......5.85

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ..5.425
Aliquippa,Pa.(9) J5 ..5.425
Alton,Ill. L1 ....5.625
Atlanta(9) A11 ......5.625
Bessemer,Ala.(9) T2 ..5.425
Birmingham(9) C15 ...5.425
Bridgeport,Conn.(9) N19 5.65
Buffalo(9) R2 ....5.425
Clairton,Pa. (9) U5....5.425
Cleveland(9) R2 .....5.425
Ecorse,Mich.(9) G5....5.525
Emeryville,Calif. J7 ..6.175
Fairfield,Ala.(9) T2 ..5.425
Fairless,Pa. (9) U5...5.575
Fontana,Calif.(9) K1 .6.125
Gary,Ind.(9) U5 ......5.425
Houston(9) S5 ....5.675
Ind.Harbor(9) I-2, Y1 5.425
Johnstown,Pa.(9) B2 ..5.425
Joliet,Ill. P22 ....5.425
KansasCity,Mo.(9) S5..5.675
Lackawanna(9) B2 ....5.425
LosAngeles(9) B3 ....6.125
Milton,Pa. M18 ....5.575
Minnequa,Colo. C10 ..5.875
Niles,Calif. P1 ....6.125
N.T'wanda,N.Y.(46)B11 5.775
Pittsburg,Calif.(9) C11.6.125
Pittsburgh(9) J5 .....5.425
Portland,Oreg. O4 ....6.175
Seattle B3, N14 ......6.175
S.Ch'c'go(9)R2,U5,W14 5.425
S.Duquesne,Pa.(9) U5..5.425
S.SanFran.,Calif.(9)B3 6.175
Sterling,Ill.(1)(9) N15..5.425
Sterling,Ill.(9) N15 ....5.525
Struthers,O. Y1 ......5.425
Tonawanda,N.Y. B12 ..5.425
Torrance,Calif.(9) C11.6.125
Youngstown(9) R2, U5 5.425

BARS, H.R. Leaded Alloy (Including leaded extra)
Warren,O. C17 ....7.475

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.475
Bethlehem,Pa. B2 ....6.475
Bridgeport,Conn. N19 ..6.55
Buffalo R2 ....6.475
Canton,O. R2, T7 ....6.475
Clairton,Pa. U5 ......6.475
Detroit S41 ....6.475
Economy,Pa. B14 .....6.475
Ecorse,Mich. G5 ......6.575
Fairless,Pa. U5 ......6.625
Farrell,Pa. S3 ....6.475
Fontana,Calif. K1 ....7.525
Gary,Ind. U5 ....6.475
Houston S5 ....6.725
Ind.Harbor,Ind. I-2, Y1 6.475
Johnstown,Pa. B2 ....6.475
KansasCity,Mo. S5 ...6.725
Lackawanna,N.Y. B2 ..6.475
Lowellville,O. S3 .....6.475
LosAngeles B3 ....7.525
Massillon,O. R2 ....6.475
Midland,Pa. C18 ......6.475
Pittsburgh J5 ....6.475
Sharon,Pa. S3 ....6.475
S.Chicago R2, U5, W14 6.475
S. Duquesne,Pa. U5....6.475
Struthers,O. Y1 ......6.475
Warren,O. C17 ....6.475
Youngstown U5 ....6.475

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 .....7.925
Bessemer,Ala. T2 .....7.925
Bethlehem,Pa. B2 ....7.925
Bridgeport,Conn. N19 ..7.95
Clairton,Pa. U5 ....7.925
Cleveland R2 ....7.925
Ecorse,Mich. G5 ......8.025
Fairfield,Ala. T2 .....7.925
Fontana,Calif. K1 ....8.625
Gary,Ind. U5 ....7.925
Houston S5 ....8.175
Ind.Harbor,Ind. Y1 ...7.925
Johnstown,Pa. B2 ....7.925
KansasCity,Mo. S5 ...8.175
Lackawanna,N.Y. B2..7.925
LosAngeles B3 ....8.625
Pittsburgh J5 ....7.925
Seattle B3 ....8.675
S.Chicago,Ill. U5, W14 7.925
S.Duquesne,Pa. U5 ...7.925
S.SanFrancisco B3 ...8.675
Struthers,O. Y1 ......7.925
Youngstown U5 ....7.925

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.575
Houston(9) S5 ....5.675
KansasCity,Mo.(9) S5..5.675
Lackawanna(9) B2 ....5.425
Sterling,Ill. N15 ......5.525
Sterling,Ill.(1) N15 ....5.425
Tonawanda,N.Y. B12 ..5.425

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 ......5.425
Atlanta A11 ....5.625
Joliet,Ill. P22 ....5.425
Niles,Calif. P1 ....6.125
Pittsburgh J5 ....5.425
Portland,Oreg. O4 ....6.175
SanFrancisco S7 ......6.275
Seattle B3 ....6.175

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 ......6.55
Clairton,Pa. U5 ....6.55
Gary,Ind. U5 ....6.55
Houston S5 ....6.80
KansasCity,Mo. S5 ....6.80
Pittsburgh J5 ....6.55
Youngstown U5 ....6.55

BARS, C.F., Leaded Alloy (Including leaded extra)
Ambridge,Pa. W18 ...9.925
BeaverFalls,Pa. M12 ..9.925
Camden,N.J. P13 ....10.10
Chicago W18 ....9.925
Cleveland C20 ....9.925
Elyria,O. W8 ....9.925
LosAngeles P2, S30
(Grade A) 11.30
(Grade B) 11.80
Monaca,Pa. S17 ......9.925
Newark,N.J. W18 ....10.10
SpringCity,Pa. K3 ....10.10
Warren,O. C17 ....9.925

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 .....7.30
BeaverFalls,Pa. M12,R2 7.30
Birmingham C15 ....7.90
Bridgeport,Conn. N19 ..7.65
Buffalo B5 ....7.35
Camden,N.J. P13 ......7.75
Carnegie,Pa. C12 ......7.30
Chicago W18 ....7.30
Cleveland A7, C20 .....7.30
Detroit B5, P17 ....7.50
Detroit S41 ....7.30
Donora,Pa. A7 ....7.30
Elyria,O. W8 ....7.30
FranklinPark,Ill. N5 ...7.30
Gary,Ind. R2 ....7.30
GreenBay,Wis. F7 .....7.30
Hammond,Ind. J5, L2 ..7.30
Hartford,Conn. R2 .....7.80
Harvey,Ill. B5 ....7.30
LosAngeles (49), S30 ...8.75
LosAngeles P2, R2 ....8.75
Mansfield,Mass. B5 ....7.85
Massillon,O. R2, R8 ....7.30
Midland,Pa. C18 ....7.30
Monaca,Pa. S17 ....7.30
Newark,N.J. W18 ......7.75
NewCastle,Pa.(17) B4 ..7.30
Pittsburgh J5 ....7.30
Plymouth,Mich. P5 ....7.55
Putnam,Conn. W18 ....7.85
Readville,Mass. C14 ...7.85
S.Chicago,Ill. W14 .....7.30
SpringCity,Pa. K3 .....7.75
Struthers,O. Y1 ....7.30
Warren,O. C17 ....7.30
Willimantic,Conn. J5 ..7.80
Waukegan,Ill. A7 ......7.30
Youngstown F3, Y1 ....7.30

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19.6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....8.775
BeaverFalls,Pa.M12,R2 8.775
Bethlehem,Pa. B2 ....8.775
Bridgeport,Conn. N19 ..8.925
Buffalo B5 ....8.775
Camden,N.J. P13 .....8.95
Canton,O. T7 ....8.775
Carnegie,Pa. C12 .....8.775
Chicago W18 ....8.775
Cleveland A7, C20 ....8.775
Detroit B5, P17 ......8.975
Detroit S41 ....8.775
Donora,Pa. A7 ....8.775
Elyria,O. W8 ....8.775
FranklinPark,Ill. N5 ..8.775
Gary,Ind. R2 ....8.775
GreenBay,Wis. F7 ....8.775
Hammond,Ind. J5, L2..8.775
Hartford,Conn. R2 ....9.075
Harvey,Ill. B5 ....8.775
Lackawanna,N.Y. B2 ..8.775
LosAngeles P2 ....10.65
LosAngeles S30 ......10.75
Mansfield,Mass. B5 ...9.075
Massillon,O. R2, R8 ..8.775
Midland,Pa. C18 ......8.775
Monaca,Pa. S17 ......8.775
Newark,N.J. W18 .....8.95
Plymouth,Mich. P5 ...8.975
S.Chicago W14 ....8.775
SpringCity,Pa. K3 .....8.95
Struthers,O. Y1 ....8.775
Warren,O. C17 ....8.775
Waukegan,Ill. A7 .....8.775
Worcester,Mass. A7...9.075
Youngstown F3, Y1 ..8.775

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 ... 5.425
Atlanta A11 ....5.625
Birmingham C15, S42 5.425
Bridgeport,Conn. N19 ...5.65
Buffalo R2 ....5.425
Cleveland R2 ....5.425
Ecorse,Mich. G5 .....5.775
Emeryville,Calif. J7 ..6.175
Fairfield,Ala. T2 ......5.425
Fairless,Pa. U5 ....5.575
Fontana,Calif. K1 ....6.125
Ft.Worth,Tex.(4)(26)T4 5.875
Gary, Ind. U5 ....5.425
Houston S5 ....5.675
Ind.Harbor,Ind. I-2,Y1 5.425
Johnstown,Pa. B2 ....5.425
Joliet,Ill. P22 ....5.425
KansasCity,Mo. S5 ....5.675
Lackawanna,N.Y. B2 ..5.425
Los Angeles B3 ....6.125
Milton,Pa. M18 ....5.575
Minnequa,Colo. C10 ...5.875
Niles,Calif. P1 ....6.125
Pittsburg,Calif. C11 ..6.125
Pittsburgh J5 ....5.425
Portland,Oreg. O4 ....6.175
SandSprings,Okla. S5 ..5.925
Seattle B3, N14 ....6.175
S.Chicago,Ill. R2 .....5.425
S.Duquesne,Pa. U5 ....5.425
S.SanFrancisco B3 ....6.175
SparrowsPoint,Md. B2..5.425
Sterling,Ill.(1) N15 ...5.425
Sterling. Ill. N15 .....5.525
Struthers,O. Y1 ......5.425
Tonawanda,N.Y. B12 ...6.00
Torrance,Calif. C11 ....6.125
Youngstown R2, U5 ..5.425

BARS, Reinforcing (Fabricated; to Consumers)

Boston B2 ....7.56
Chicago U8 ....6.91
Cleveland U8 ....6.89
Johnstown,Pa. B2 .....7.08
KansasCity,Mo. S5 .....7.35
Lackawanna,N.Y. B2 ..6.85
Marion,O. P11 ....6.70
Newark,N.J. U8 ....7.55
Philadelphia U8 ....7.38
Pittsburgh J5, U8 ....7.10
Seattle B3, N14 ....7.70
SparrowsPt.,Md. B2 ....7.08
St.Paul U8 ....7.92
Williamsport,Pa. S19 ..7.00

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 14.45
Economy,Pa.(D.R.)B14 18.00
Economy,(Staybolt)B14 18.45

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2.5.325
ChicagoHts.(4)(44) I-2.5.425
ChicagoHts.(4) C2 ....5.425
Ft.Worth,Tex.(26) T4..5.875
Franklin,Pa. (3) F5 ..5.325
Franklin,Pa. (4) F5 ..5.425
JerseyShore,Pa.(3) J8 ..5.30
Marion,O.(3) P11 ....5.325
Tonawanda(3) R12 ....5.325
Tonawanda(4) B12 ....6.00
Williamsport,Pa. (3)S19 5.50

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 .....4.925
Allenport,Pa. P7 ......4.925
Ashland,Ky.(8) A10 ..4.925
Cleveland J5, R2 ....4.925
Conshohocken,Pa. A3 ..4.975
Detroit(8) M1 ....5.025
Ecorse,Mich. G5 .....5.025
Fairfield,Ala. T2 .....4.925
Fairless,Pa. U5 ....4.975
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 ....4.925
Geneva,Utah C11 .....5.025
GraniteCity,Ill.(8) G4 ..5.125
Ind.Harbor,Ind. I-2, Y1 4.925
Irvin,Pa. U5 ....4.925
Lackawanna,N.Y. B2 ..4.925
Mansfield,O. E6 ......4.925
Munhall,Pa. U5 ....4.925
Newport,Ky.(8) A2 ..4.925
Niles,O. M21, S3 ....4.925
Pittsburg,Calif. C11 ..5.625
Pittsburgh J5 ....4.925
Portsmouth,O. P12 ....4.925
Riverdale,Ill. A1 .....4.925
Sharon,Pa. S3 ....4.925
S.Chicago,Ill. W14 ....4.925
SparrowsPoint,Md. B2..4.925
Steubenville,O. W10 ...4.925
Warren,O. R2 ....4.925
Weirton,W.Va. W6 ....4.925
Youngstown U5, Y1 ..4.925

SHEETS, H.R., (19 Ga. & Lighter)

Niles,O. M21 ....6.05

SHEETS, H.R. Alloy

Gary,Ind. U5 ....8.10
Ind.Harbor,Ind. Y1 ....8.10
Irvin,Pa. U5 ....8.10
Munhall,Pa. U5 ....8.10
Newport,Ky. A2 ....8.10
Youngstown U5, Y1 ....8.10

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Cleveland J5, R2 ....7.275
Conshohocken,Pa. A3 ..7.325
Ecorse,Mich. G5 .....7.375
Fairfield,Ala. T2 ....7.275
Fairless,Pa. U5 ....7.325
Farrel,Pa. S3 ....7.275
Fontana,Calif. K1 .....8.175
Gary,Ind. U5 ....7.275
Ind.Harbor,Ind. I-2, Y1 7.275
Irvin,Pa. U5 ....7.275
Lackawanna (35) B2 ..7.275
Munhall,Pa. U5 ....7.275
Pittsburgh J5 ....7.275
S.Chicago,Ill. U5, W14 7.275
Sharon,Pa. S3 ....7.275
SparrowsPoint(36) B2..7.275
Warren,O. R2 ....7.275
Weirton,W.Va. W6 ....7.275
Youngstown U5, Y1 ..7.275

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ..5.175
Cleveland R2 ....5.675
Warren,O. R2 ....5.675

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 ....6.80
Middletown,O. A10 ....6.55
Warren,O. R2 ....6.80

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6:05
Allenport,Pa. P7 ......6.05
Cleveland J5, R2 ......6.05
Conshohocken,Pa. A3 ..6.10
Detroit M1 ....6.05
Ecorse,Mich. G5 ....6.15
Fairfield,Ala. T2 ....6.05
Fairless,Pa. U5 ....6.10
Follansbee,W.Va. F4 ..6.05
Fontana,Calif. K1 ....7.30
Gary,Ind. U5 ....6.05
GraniteCity,Ill. G4 ....6.25
Ind.Harbor,Ind. I-2, Y1 6.05
Irvin,Pa. U5 ....6.05
Lackawanna,N.Y. B2 ..6.05
Mansfield,O. E6 ......6.05
Middletown,O. A10 ....6.05
Newport,Ky. A2 ....6.05
Pittsburg,Calif. C11 ...7.00
Pittsburgh J5 ....6.05
Portsmouth,O. P12 ....6.05
SparrowsPoint,Md. B2 ..6.05
Steubenville,O. W10 ....6.05
Warren,O. R2 ....6.05
Weirton,W.Va. W6 ....6.05
Yorkville,O. W10 ......6.05
Youngstown Y1 ....6.05

SHEETS, Cold-Rolled High-Strength, Low-Alloy

Cleveland J5, R2 ....8.975
Ecorse, Mich. G5 .....9.075
Fairless,Pa. U5 ......9.025
Fontana,Calif. K1 ....10.275
Gary,Ind. U5 ....8.975
IndianaHarbor,Ind. Y1 8.975
Irvin,Pa. U5 ....8.975
Lackawanna (37) B2 ..8.975
Pittsburgh J5 ....8.975
SparrowsPoint (38) B2 8.975
Warren,O. R2 ....8.975
Weirton,W.Va. W6 ....8.975
Youngstown Y1 ....8.975

SHEETS, Culvert

	Cu Steel	Cu Fe
Ashland,Ky. A10	6.95	7.20
Canton,O. R2	6.95	7.45
Fairfield T2	6.95	7.20
Gary,Ind. U5	6.95	7.20
GraniteCity,Ill. G4	7.15	...
Ind.Harbor I-2	6.95	7.20
Irvin,Pa. U5	6.95	7.20
Kokomo,Ind. C16	7.05	...
MartinsFry. W10	6.95	7.20
Pitts.,Calif. C11	7.70	...
Pittsburgh J5	6.95	...
SparrowsPt. B2	6.95	...

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 .. 7.20

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 .....6.60‡
Ashland,Ky. A10 .....6.60†
Canton,O. R2 ....6.60‡
Dover,O. R1 ....6.60†
Fairfield,Ala. T2 .....6.60†
Gary,Ind. U5 ....6 60*
GraniteCity,Ill. G4 ....6.80*
Ind.Harbor,Ind. I-2 ...6.60†
Irvin,Pa. U5 ....6.60*
Kokomo,Ind. C16 ....6.70‡
MartinsFerry,O. W10 ..6.60*
Middletown,O. A10 ....6.60†
Pittsburg,Calif. C11 ...7.35*
Pittsburgh J5 ....6.60†
SparrowsPt.,Md. B2 ..6.60†
Warren,O. R2 ....6.60†
Weirton,W.Va. W6 ....6.60*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 ....9.725
SparrowsPt.(39) B2 ...9.725

SHEETS, Galvannealed Steel

Canton,O. R2 ....7.00
Irvin,Pa. U5 ....7.00

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....6.85
Middletown,O. A10 ....6.85

SHEETS, Electrogalvanized

Cleveland (28) R2 ....7.425
Niles,O. (28) R2 ......7.425
Weirton,W.Va. W6 ...7.275

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1).9.25
Butler,Pa. A10 (type 2).9.35

SHEETS, Enameling Iron

Ashland,Ky. A10 ......6.625
Cleveland R2 ....6.625
Gary,Ind. U5 ....6.625
GraniteCity,Ill. G4 ....6.825
Ind.Harbor,Ind. I-2,Y1 6.625
Irvin,Pa. U5 ....6.625
Middletown,O. A10 ....6.625
Niles,O. M21, S3 ......6.625
Youngstown Y1 ......6.625

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ...8.65
Ind.Harbor,Ind. I-2 ...8.475
Yorkville,O. W10 ......8.475

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.00
Gary,Ind. U5 ....7.00
Mansfield,O. E6 ....7.00
Middletown,O. A10 ....7.00
Niles,O. M21, S3 ......7.00
Warren,O. R2 ....7.00
Weirton,W.Va. W6 ....7.00

SHEETS, Long Terne, Ingot Iron

Middeltown,O. A10 .....7.40

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve.Cold Rolling Mills
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Dearborn Div. Sharon Steel Corp.
D4 Disston Div. H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 EasternGas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md.Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Div. Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.
M22 Mill Strip Products Co.

N1 National Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelson Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwestern.SteelRoll.Mill
N15 Northwestern S.&W. Co.
N19 Northeastern Steel Corp.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div. Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless Steel Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Div. Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.925
Allenport,Pa. P7	4.925
Alton,Ill. L1	5.125
Ashland,Ky.(8) A10	4.925
Atlanta A11	5.125
Bessemer,Ala. T2	4.925
Birmingham C15	4.925
Buffalo (27) R2	4.925
Conshohocken,Pa. A3	4.975
Detroit M1	5.025
Ecorse,Mich. G5	5.025
Fairfield,Ala. T2	4.925
Fontana, Calif. K1	5.825
Gary,Ind. U5	4.925
Ind.Harbor,Ind. I-2, Y1	4.925
Johnstown,Pa. (25) B2	4.925
Lackaw'na,N.Y.(25) B2	4.925
LosAngeles(25) B3	5.675
Minnequa, Colo. C10	6.025
Pittsburg,Calif. C11	5.675
Riverdale,Ill. A1	4.925
SanFrancisco S7	6.35
Seattle(25) B3	6.35
Seattle N14	6.35
Sharon,Pa. S3	4.925
S.SanFrancisco(25) B3	5.675
SparrowsPoint,Md. B2	4.925
Sterling,Ill. (1) N15	4.925
Sterling,Ill. N15	5.025
Torrance,Calif. C11	5.675
Warren,O. R2	4.925
Weirton,W.Va. W6	4.925
Youngstown U5	4.925

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18	8.10
Farrell,Pa. S3	8.10
Gary,Ind. U5	8.10
Houston S5	8.35
Ind.Harbor,Ind. Y1	8.10
KansasCity,Mo. S5	8.35
LosAngeles B3	9.30
Lowellville,O. S3	8.10
Newport,Ky. A2	8.10
Sharon,Pa. S3	8.10
S.Chicago,Ill. W14	8.10
Youngstown U5, Y1	8.10

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2	7.325
Conshohocken,Pa. A3	7.325
Ecorse,Mich. G5	7.425
Fairfield,Ala. T2	7.325
Farrell,Pa. S3	7.325
Gary,Ind. U5	7.325
Ind.Harbor,Ind. I-2, Y1	7.325
Lackawanna,N.Y. B2	7.325
LosAngeles(25) B3	8.075
Seattle(25) B3	8.325
Sharon,Pa. S3	7.325
S.Chicago,Ill. W14	7.325
S.SanFrancisco(25) B3	8.075
SparrowsPoint,Md. B2	7.325
Warren,O. R2	7.325
Weirton,W.Va. W6	7.325
Youngstown U5, Y1	7.325

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	5.175
Warren,O. R2	5.675

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	7.15
Baltimore T6	7.15
Boston T6	7.70
Buffalo S40	7.15
Cleveland A7, J5	7.15
Conshohocken,Pa. A3	7.20
Dearborn,Mich. D3	7.25
Detroit D2, M1, P20	7.25
Dover,O. G6	7.15
Ecorse,Mich. G5	7.25
Evanston,Ill. M22	7.25
Follansbee,W.Va. F4	7.15
Fontana,Calif. K1	9.00
Franklin Park,Ill. T6	7.25
Ind.Harbor,Ind. Y1	7.15
Indianapolis J5	7.30
LosAngeles J5	9.05
LosAngeles C1	9.20
NewBedford,Mass. R10	7.60
NewBritain(10) S15	7.15
NewCastle,Pa. B4, E5	7.15
NewHaven,Conn. D2	7.60
NewKensington,Pa. A6	7.15
Pawtucket,R.I. R3	7.80
Pawtucket,R.I. N8	7.70
Philadelphia(45) P24	7.70
Pittsburgh J5	7.15
Riverdale,Ill. A1	7.25
Rome,N.Y. (32) R6	7.15
Sharon,Pa. S3	7.15
Trenton,N.J. (31) R5	8.60
Wallingford,Conn. W2	7.60
Warren,O. R2, T5	7.15
Weirton,W.Va. W6	7.15
Worcester,Mass. A7	7.70
Youngstown J5, Y1	7.15

STRIP, Cold-Rolled Alloy

Boston T6	15.40
Carnegie,Pa. S18	15.05
Cleveland A7	15.05
Dover,O. G6	15.05
Farrell,Pa. S3	15.05
FranklinPark,Ill. T6	15.05
Harrison,N.J. C18	15.05
Indianapolis J5	15.20
Lowellville,O. S3	15.05
Pawtucket,R.I. N8	15.40
Riverdale,Ill. A1	15.05
Sharon,Pa. S3	15.05
Worcester,Mass. A7	15.35
Youngstown J5	15.05

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.45
Dearborn,Mich. D3	10.60
Dover,O. G6	10.45
Ecorse,Mich. G5	10.55
Farrell,Pa. S3	10.50
Ind.Harbor,Ind. Y1	10.65
Sharon,Pa. S3	10.50
Warren,O. R2	10.45
Weirton,W.Va. W6	10.50
Youngstown Y1	10.65

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	7.90

STRIP, C.R. Electrogalvanized

Cleveland A7	7.15*
Dover,O. G6	7.15*
Evanston,Ill. M22	7.25*
Riverdale,Ill. A1	7.25*
Warren,O. B9, T5	7.15*
Worcester,Mass. A7	7.70*
Youngstown J5	7.15*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3	7.275

TIGHT COOPERAGE HOOP

Atlanta A11	5.65
Riverdale,Ill. A1	5.50
Sharon,Pa. S3	5.35
Youngstown U5	5.35

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	...	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. D3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	....	....
Fostoria,O. S1	10.05	11.15	13.10	16.10	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	...	...	12.90	16.10	19.30
Indianapolis J5	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles J5	11.15	12.60	14.80	....	....
NewBritain,Conn.(10) S15	8.95	10.40	12.60	15.60	18.55
NewCastle,Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
NewYork W3	...	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y.(32) R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	...	10.70	12.90	16.10	19.30
Wallingford,Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown J5	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)

			Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	...	...	18.10	21.95	26.30
Buffalo W12	...	...	18.10	....	....
Fostoria,O. S1	...	...	18.30	22.15	....
FranklinPark,Ill. T6	...	...	18.45	22.30	26.65
Harrison,N.J. C18	...	...	18.10	21.95	26.30
NewYork W3	...	...	18.10	21.95	26.30
Palmer,Mass. W12	...	...	18.10	....	....
Trenton,N.J. R5	...	...	18.10	21.95	26.30
Worcester,Mass. A7, T6	...	...	18.10	21.95	26.30
Youngstown J5	...	...	18.45	22.30	26.65

SILICON STEEL

H.R.SHEETS(22 Ga.,cut lengths)

	Field	Armature	Electric	Motor	Dynamo
BeechBotton,W.Va. W10	....	....	11.80	12.90	13.95
Mansfield,O. E6	9.625	11.10	11.80	12.90	13.95
Newport,Ky. A2	9.625	11.10	11.80	12.90	13.95
Niles,O. M21, S3	9.625	11.10	11.80	12.90	....
Vandergrift,Pa. U5	....	11.10	11.80	12.90	13.95
Warren,O. R2	9.625	11.10	11.80	12.90	....
Zanesville,O. A10	....	11.10	11.80	12.90	13.95
Zanesville,O. A10 (SP Coils)	....	....	11.55	12.65	13.70

C.R. COILS & CUT LENGTHS (22 Ga.) Fully Processed (Semiprocessed ½c lower)

	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.35	12.05	13.15	14.20
Brackenridge,Pa. A4	....	....	12.05	13.15	14.20
GraniteCity,Ill. G4	9.825*	11.05*	11.75*	12.85*	....
IndianaHarbor,Ind. I-2	9.625†	10.85*	11.55*	12.65*	....
Mansfield,O. E6	9.625*	11.35	12.05	13.50	14.20
Vandergrift,Pa. U5	9.625*	11.35	12.05	13.15	14.20
Warren,O. R2	9.625*	11.35	12.05	13.15	14.20
Zanesville,O. A10 (FP Coils)	...	11.35	12.05	13.15	14.20

H.R. SHEETS (22Ga., cut lengths) — Transformer Grades

	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.00	15.55	16.05	17.10
Vandergrift,Pa. U5	14.75	15.55	16.05	17.10
Zanesville,O. A10	15.00	15.55	16.05	17.10

C.R. COILS & CUT LENGTHS (22 Ga.) — Grain Oriented

	T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	17.60	19.20	19.70	20.20	....
Butler,Pa. A10	....	....	19.20	19.70	20.20	....
Vandergrift,Pa. U5	16.60	17.60	19.20	19.70	20.20	15.25**
Warren,O. R2	....	....	....	....	....	15.25‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths, ¾-cent lower.

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.75	$9.00	$9.40
Fairfield,Ala. T2	8.85	9.10	9.50
Fairless,Pa. U5	8.85	9.10	9.50
Fontana,Calif. K1	9.50	9.75	10.15
Gary,Ind. U5	8.75	9.00	9.40
GraniteCity,Ill. G4	8.85	9.10	9.50
IndianaHarbor,Ind. I-2, Y1	8.75	9.00	9.40
Irvin,Pa. U5	8.75	9.00	9.40
Niles,O. R2	8.75	9.00	9.40
Pittsburg,Calif. C11	9.50	9.75	10.15
SparrowsPoint,Md. B2	8.85	9.10	9.50
Weirton,W.Va. W6	8.75	9.00	9.40
Yorkville,O. W10	8.75	9.00	9.40

ELECTROTIN (22-27 Gage; Dollars per 100 lb)

Aliquippa,Pa. J5	7.725	7.925	....
Niles,O. R2	7.725	7.925	8.125

TINPLATE, American

	1.25 lb	1.50 lb
Aliquippa,Pa.J5	$10.05	$10.30
Fairfield,Ala.T2	10.15	10.40
Fairless,Pa. U5	10.15	10.40
Fontana,Calif.K1	10.80	11.05
Gary,Ind. U5	10.05	10.30
Irvin,Pa. U5	10.05	10.30
Pitts.,Calif. C11	10.80	11.05
Sp.Pt.,Md. B2	10.15	10.40
Weirton,W.Va.W6	10.05	10.30
Yorkville,O. W10	10.05	10.30
Niles,O. R2	7.85	
Pittsburg,Calif. C11	8.60	
SparrowsPoint,Md. B2	7.95	
Weirton,W.Va. W6	7.85	
Yorkville,O. W10	7.85	

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$7.85
Fairfield,Ala. T2	7.95
Fairless,Pa. U5	7.95
Fontana,Calif. K1	8.60
Gary Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. I-2, Y1	7.85
Irvin,Pa. U5	7.85

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5	$7.50
Gary,Ind. U5	7.50
GraniteCity,Ill. G4	7.60
Ind.Harbor,Ind. Y1	7.50
Irvin,Pa. U5	7.50
Yorkville,O. W10	7.50

MANUFACTURING TERNES (Special Coated, Base Box)

Gary,Ind. U5	$9.70
Irvin,Pa. U5	9.70

ROOFING SHORT TERNES (8 lb Coated, Base Box)

Gary,Ind. U5	$11.25

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	7.65
Aliquippa,Pa. J5	7.65
Alton,Ill. L1	7.85
Atlanta A11	7.85
Bartonsville,Ill. K4	7.75
Buffalo W12	7.65
Chicago W13	7.65
Cleveland A7, C20	7.65
Crawfordsville,Ind. M8	7.75
Donora,Pa. A7	7.65
Duluth A7	7.65
Fairfield,Ala. T2	7.65
Fostoria,O.(24) S1	7.75
Houston S5	7.90
Jacksonville,Fla. M8	8.00
Johnstown,Pa. B2	7.65
Joliet,Ill. A7	7.65
KansasCity,Mo. S5	7.90
Kokomo,Ind. C16	7.75
LosAngeles B3	8.60
Minnequa,Colo. C10	7.90
Monessen,Pa. P7, P16	7.65
N.Tonawanda,N.Y. B11	7.65
Palmer,Mass. W12	7.95
Pittsburg,Calif. C11	8.60
Portsmouth,O. P12	7.65
Rankin,Pa. A7	7.65
S.Chicago,Ill. R2	7.65
S.SanFrancisco C10	8.60
SparrowsPoint,Md. B2	7.75
Sterling,Ill.(1) N15	7.65
Sterling,Ill. N15	7.75
Struthers,O. Y1	7.65
Waukegan,Ill. A7	7.65
Worcester,Mass. A7	7.95

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4	12.65
Buffalo W12	12.65
Cleveland A7	12.65
Donora,Pa. A7	12.65
Duluth A7	12.65
Johnstown,Pa. B2	12.65
Minnequa,Colo. C10	12.775
Monessen,Pa. P16	12.65
Muncie,Ind. I-7	12.85
New Haven,Conn. A7	12.95
Palmer,Mass. W12	12.95
Pittsburg,Calif. C11	13.45
Portsmouth,O. P12	12.65
Roebling,N.J. R5	12.95
SparrowsPt.,Md. B2	12.75
Struthers,O. Y1	12.65
Trenton,N.J. A7	12.95
Waukegan,Ill. A7	12.65
Worcester,Mass. A7	12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5	9.30
Alton,Ill. L1	9.50
Buffalo W12	9.30
Cleveland A7	9.30
Donora,Pa. A7	9.30
Duluth A7	9.30
Johnstown,Pa. B2	9.30
KansasCity,Mo. S5	9.55
LosAngeles B3	10.25
Minnequa,Colo. C10	9.50
Monessen,Pa. P7, P16	9.30
NewHaven,Conn. A7	9.60
Palmer,Mass. W12	9.60
Pittsburg,Calif. C11	10.25
Portsmouth,O. P12	9.30
Roebling,N.J. R5	9.60
S.Chicago,Ill. R2	9.30
S.SanFrancisco C10	10.25
SparrowsPt.,Md. B2	9.40
Struthers,O. Y1	9.30
Trenton,N.J. A7	9.60
Waukegan,Ill. A7	9.30
Worcester,Mass. A7	9.60

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	9.30
Alton,Ill. L1	9.50
Bartonville,Ill. K4	9.40
Buffalo W12	9.30
Cleveland A7	9.30
Donora,Pa. A7	9.30
Duluth A7	9.30
Fostoria,O. S1	9.35
Johnstown,Pa. B2	9.30
KansasCity,Mo. S5	9.55
LosAngeles B3	10.25
Milbury,Mass.(12) N6	9.60
Minnequa,Colo. C10	9.50
Monessen,Pa. P7, P16	9.30
Muncie,Ind. I-7	9.50
Palmer,Mass.(12) W12	9.60
Pittsburg,Calif. C11	10.25
Portsmouth,O. P12	9.30
Roebling,N.J. R5	9.60
S.Chicago,Ill. R2	9.30
S.SanFrancisco C10	10.25
SparrowsPt.,Md. B2	9.40
Struthers,O. Y1	9.30
Trenton,N.J. A7	9.60
Waukegan,Ill. A7	9.30
Worcester,A7, J4, T6	9.60

WIRE, Fine & Weaving (8" Coils)

Alton,Ill. L1	15.80
Bartonville,Ill. K4	15.70
Buffalo W12	15.60
Chicago W13	15.60
Cleveland A7	15.60
Crawfordsville,Ind. M8	15.70
Fostoria,O. S1	15.60
Houston S5	15.85
Jacksonville,Fla. M8	15.95
Johnstown,Pa. B2	15.60
KansasCity,Mo. S5	15.85
Kokomo,Ind. C16	15.60
Minnequa,Colo. C10	15.85
Monessen,Pa. P7, P16	15.60
Muncie,Ind. I-7	15.80
Palmer,Mass. W12	15.90
S.SanFrancisco C10	16.45
Waukegan,Ill. A7	15.60
Worcester,Mass. A7, T6	15.90

ROPE WIRE

Bartonville,Ill. K4	12.75
Buffalo W12	12.75
Fostoria,O. S1	12.75
Johnstown,Pa. B2	12.75
Monessen,Pa. P7	12.75
Muncie,Ind. I-7	12.95
Palmer,Mass. W12	13.05
Portsmouth,O. P12	12.75
Roebling,N.J. R5	13.05
SparrowsPt.,Md. B2	12.85
Struthers,O. Y1	12.75
Worcester,Mass. J4	13.05

(A) Plow and Mild Plow: add 0.25c for Improved Plow

WIRE, Tire Bead
Bartonville,Ill. K4 ....16.55
Monessen,Pa. P16 .....16.55
Roebling,N.J. R5 ......17.05

WIRE, Cold-Rolled Flat
Anderson,Ind. G6 .....11.65
Baltimore T6 ....11.95
Boston T6 ....11.95
Buffalo W12 ....11.65
Chicago W13 ....11.75
Cleveland A7 ....11.65
Crawfordsville,Ind. M8.11.65
Dover,O. G6 ....11.65
Fostoria,O. S1 ....11.95
FranklinPark,Ill. T6 ..11.75
Kokomo,Ind. C16 ......11.65
Massillon,O. R8 ....11.65
Milwaukee C23 ....11.85
Monessen,Pa. P7, P16..11.65
Palmer,Mass. W12 ....11.95
Pawtucket,R.I. N8 .....11.95
Philadelphia P24 ......11.95
Riverdale,Ill. A1 ......11.75
Rome,N.Y. R6 ....11.65
Sharon,Pa. S3 ....11.65
Trenton,N.J. R5 ....11.95
Warren,O. B9 ....11.65
Worcester,Mass. A7, T6 11.95

NAILS, Stock Col.
AlabamaCity,Ala. R2 ...173
Aliquippa,Pa. J5 173
Atlanta A11 175
Bartonville,Ill. K4 175
Chicago W13 173
Cleveland A9 173
Crawfordsville,Ind. M8 ..175
Donora,Pa. A7 173
Duluth A7 173
Fairfield,Ala. T2 173
Houston,Tex. S5 178
Jacksonville,Fla.(20) M8.184
Johnstown,Pa. B2 173
Joliet,Ill. A7 173
KansasCity,Mo. S5 178
Kokomo,Ind. C16 175
Minnequa,Colo. C10 178
Monessen,Pa. P7 173
Pittsburg,Calif. C11 192
Rankin,Pa. A7 173
S.Chicago,Ill. R2 173
SparrowsPt.,Md. B2 175
Sterling,Ill.(7) N15 175
Worcester,Mass. A7 179
(To Wholesalers; per cwt)
Galveston,Tex. D7 .....$9.10

NAILS, Cut (100 lb keg) To Dealers (33)
Conshohocken,Pa. A3 ..$9.80
Wheeling,W.Va. W10 ...9.80

POLISHED STAPLES Col.
AlabamaCity,Ala. R2 ...175
Aliquippa,Pa. J5 175
Atlanta A11 177
Bartonville,Ill. K4 177
Crawfordsville,Ind. M8 ..177
Donora,Pa. A7 175
Duluth A7 175
Fairfield,Ala. T2 175
Jacksonville,Fla.(20) M8.186
Johnstown,Pa. B2 175
Joliet,Ill. A7 175
Kokomo,Ind. C16 177
Minnequa,Colo. C10 180
Pittsburg,Calif. C11 194
Rankin,Pa. A7 175
S.Chicago,Ill. R2 175
SparrowsPt.,Md. B2 177
Sterling,Ill.(7) N15 175
Worcester,Mass. A7 181

TIE WIRE, Automatic Baler (14½ Ga.)(Per 97 lb Net Box)
Coil No. 3150
AlabamaCity,Ala. R2.$10.26
Atlanta A11 ....10.36
Bartonville,Ill. K4 ....10.36
Buffalo W12 ....10.26
Chicago W13 ....10.26
Crawfordsville,Ind. M8.10.36
Donora,Pa. A7 ....10.26
Duluth A7 ....10.26
Fairfield,Ala. T2 ......10.26
Houston S5 ....10.51
Jacksonville,Fla. M8 ...10.82
Johnstown,Pa. B2 ....10.26
Joliet,Ill. A7 ....10.26
KansasCity,Mo. S5 ....10.51
Kokomo,Ind. C16 ......10.36
LosAngeles B3 ....11.05
Minnequa,Colo. C10 ...10.51
Pittsburg,Calif. C11 ...11.04
S.Chicago,Ill. R2 ......10.26
S.SanFrancisco C10 ...11.04
SparrowsPt.,Md. B2 ...10.36
Sterling,Ill(37) N15 ...10.36

Coil No. 6500 Stand.
AlabamaCity,Ala. R2..$10.60
Atlanta A11 ....10.70
Bartonville,Ill. K4 .....10.70
Buffalo W12 ....10.60
Chicago W13 ....10.60
Crawfordsville,Ind. M8.10.70
Donora,Pa. A7 ....10.60
Duluth A7 ....10.60
Fairfield,Ala. T2 .....10.60
Houston S5 ....10.85
Jacksonville,Fla. M8 ...11.16
Johnstown,Pa. B2 ....10.60
Joliet,Ill. A7 ....10.60
KansasCity,Mo. S5 ....10.85
Kokomo,Ind. C16 ......10.70
LosAngeles B3 ....11.40
Minnequa,Colo. C10 ...10.85
Pittsburg,Calif. C11 ...11.40
S.Chicago,Ill. R2 ......10.60
S.SanFrancisco C10 ...11.40
SparrowsPt.,Md. B2 ...10.70
Sterling,Ill.(37) N15 ...10.70

Coil No. 6500 Interim
AlabamaCity,Ala. R2..$10.65
Atlanta A11 ....10.75
Bartonville,Ill. K4 ....10.75
Buffalo W12 ....10.65
Chicago W13 ....10.65
Crawfordsville,Ind. M8.10.75
Donora,Pa. A7 ....10.65
Duluth A7 ....10.65
Fairfield,Ala. T2 ......10.65
Houston S5 ....10.90
Jacksonville,Fla. M8 ..11.21
Johnstown,Pa. B2 ....10.65
Joliet,Ill. A7 ....10.65
KansasCity,Mo. S5 ....10.90
Kokomo,Ind. C16 ......10.75
LosAngeles B3 ....11.45
Minnequa,Colo. C10 ...10.90
Pittsburg,Calif. C11 ...11.45
S.Chicago,Ill. R2 ......10.65
S.SanFrancisco C10 ...11.45
SparrowsPt.,Md. B2 ...10.75
Sterling,Ill.(37) N15 ...10.75

BALE TIES, Single Loop Col.
AlabamaCity,Ala. R2 ...212
Atlanta A11 214
Bartonville,Ill. K4 214
Crawfordsville,Ind. M8 ..214
Donora,Pa. A7 212
Duluth A7 212
Fairfield,Ala. T2 212
Houston S5 217
Jacksonville,Fla. M8 219
Joliet,Ill. A7 212
KansasCity,Mo. S5 217
Kokomo,Ind. C16 214
Minnequa,Colo. C10 217
Pittsburg,Calif. C11 236
S.SanFrancisco C10 236
SparrowsPt.,Md. B2 214
Sterling,Ill.(7) N15 214
Williamsport,Pa. S19 175

FENCE POSTS
Birmingham C15 171
ChicagoHts.,Ill. C2, I-2..172
Duluth A7 172
Franklin,Pa. F5 172
Huntington,W.Va. C15 ..171
Johnstown,Pa. B2 172
Marion,O. P11 172
Minnequa,Colo. C10 177
Sterling,Ill.(1) N15 172
Tonawanda,N.Y. B12 ...174

WIRE, Barbed Col.
AlabamaCity,Ala. R2..193**
Aliquippa, Pa. J5 ......190§
Atlanta A11 ....198*
Bartonville,Ill. K4 198
Crawfordsville,Ind. M8 ..198
Donora,Pa. A7 ....193†
Duluth A7 ....193†
Fairfield,Ala. T2 ....193†
Houston,Tex. S5 ......198**
Jacksonville,Fla. M8 203
Johnstown,Pa. B2 ......196§
Joliet,Ill. A7 ....193†
KansasCity,Mo. S5 ....198**
Kokomo,Ind. C16 ....195†
Minnequa,Colo. C10 ...198**
Monessen,Pa. P7 ....196*
Pittsburg,Calif. C11 ....213†
Rankin,Pa. A7 ....193†
S.Chicago,Ill. R2 ......193**
S.SanFrancisco C10 ...213**
SparrowsPoint,Md. B2..198§
Sterling,Ill.(7) N15 ....198§

WOVEN FENCE, 9-15 Ga. Col.
Ala.City,Ala. R2 .....187**
Aliq'ppa,Pa.9-14¼ga.J5 190§
Atlanta A11 ....192*
Bartonville,Ill. K4 192
Crawfordsville,Ind. M8 ..192
Donora,Pa. A7 ....187†
Duluth A7 ....187†
Fairfield,Ala. T2 ....187†
Houston,Tex. S5 ......192**
Jacksonville,Fla. M8 197
Johnstown,Pa.(43) B2 ..190§
Joliet,Ill. A7 ....187†
KansasCity,Mo. S5 ....192**
Kokomo,Ind. C16 ....189†
Minnequa,Colo. C10 ...192**
Pittsburg,Calif. C11 ...210†
Rankin,Pa. A7 ....187†
S.Chicago,Ill. R2 ......187**
Sterling,Ill.(7) N15 ....192§

WIRE (16 gage) An'ld Stone / Galv. Stone
Ala.City,Ala.R2 17.15 18.70**
Aliq'ppa,Pa. J5.17.15 18.95
Bartonville K4 ..17.25 19.05
Cleveland A7 ...17.15 ....
Crawf'dsville M8 17.25 19.05
Fostoria,O. S1 ..17.65 19.20†
Houston S5 ....17.40 18.95**
Jacksonville M8.17.50 19.30
Johnstown B2 ..17.15 18.95§
Kan.City,Mo. S5 17.40 ....
Kokomo C16 ...17.25 18.80†
Minnequa C10..17.40 18.95**
P'lm'r,Mass.W12 17.45 19.00†
Pitts.,Calif. C11.17.50 19.05†
SparrowsPt. B2 .17.25 19.05§
Sterling(37) N15.17.25 19.05§
Waukegan A7 ..17.15 18.70†
Worcester A7 ...17.45 ....

WIRE, Merchant Quality (6 to 8 gage) An'ld Galv.
Ala.City,Ala. R2..8.65 9.20**
Aliquippa J5 ....8.65 9.325§
Atlanta(48) A11..8.75 9.425*
Bartonville(48) K4.8.75 9.425
Buffalo W12 .....8.65 9.20†
Cleveland A7 .....8.65 ....
Crawfordsville M8.8.75 9.425
Donora,Pa. A7 ...8.65 9.20†
Duluth A7 ....8.65 9.20†
Fairfield T2 .....8.65 9.20†
Houston(48) S5 ..8.90 9.45**
Jacks'ville,Fla. M8 9.00 9.675
Johnstown B2(48) 8.65 9.325§
Joliet,Ill. A7 .....8.65 9.20†
Kans.City(48) S5.8.90 9.45**
Kokomo C16 ......8.75 9.30†
LosAngeles B3 ..9.60 10.275§
Minnequa C10 ...8.90 9.45**
Monessen P7(48)..8.65 9.25*
Palmer,Mass. W12.8.95 9.50†
Pitts.,Calif. C11..9.60 10.15†
Rankin,Pa. A7 ...8.65 9.20†
S.Chicago R2 ....8.65 9.20**
S.SanFran. C10..9.60 10.15**
Spar'wsPt.B2(48) 8.75 9.425§
Sterling(48) N15..8.90 9.575§
Sterling(1)(48) ..8.80 9.475§
Struth'rs,O.(48)Y1 8.65 9.30‡
Worcester,Mass.A7 8.95 9.50†

Based on zinc price of: *13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. **Subject to zinc equalization extras.

FASTENERS

(Base discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts
Full Size Body (cut thread)
½ in. and smaller:
6 in. and shorter.... 49.0
Longer than 6 in. .. 39.0
⅝ in. thru 1 in.:
6 in. and shorter.... 39.0
Longer than 6 in. .. 35.0
1⅛ in. and larger:
All lengths 35.0
Undersized Body (rolled thread)
½ in. and smaller:
6 in. and shorter... 49.0
Carriage,Machine, Lag Bolts Hot Galvanized:
½ in. and smaller:
6 in. and shorter... 29.0
Longer than 6 in. .. 15.0
⅝ in. and larger:
All lengths 12.0
Lag Bolts (all diam.)
6 in. and shorter... 49.0
Longer than 6 in. .. 39.0
Plow and Tap Bolts
½ in. and smaller by 6 in. and shorter 49.0
Larger than ½ in. or longer than 6 in. .. 39.0
Blank Bolts 39.0
Step, Elevator, Tire Bolts 49.0
Stove Bolts, Slotted:
⅛ to ¼-in. incl.,
3 in. and shorter.. 55.0
$\frac{5}{16}$ to ½ in., inclusive 55.0

NUTS

Reg. & Heavy Square Nuts:
All sizes 55.5
Square Nuts, Reg. & Heavy, Hot Galvanized:
All sizes 41.0
Hex Nuts, Reg. & Heavy, Hot Pressed:
¾ in. and smaller.. 60.5
⅞ in. to 1 in., incl 55.5
1⅛ in. to 1½ in., incl. 58.5
1⅝ in. and larger.. 53.5
Hex Nuts, Reg. & Heavy, Cold Punched:
¾ in. and smaller.. 60.5
⅞ in. to 1½ in., incl 55.5
1⅝ in. and larger.. 53.5
Hex Nuts, All Types, Hot Galvanized:
¾ in. and smaller.. 46.5
⅞ in. to 1 in., incl.. 41.5
1⅛ in. to 1½ in., incl. 46.5
Hex Nuts, Semifinished, Heavy (Incl. Slotted):
¾ in. and smaller.. 60.5
⅞ in. to 1½ in., incl. 55.5
1⅝ in. and larger.. 53.5
Hex Nuts, Finished (Incl. Slotted and Castellated):
1 in. and smaller.. 63.0
1⅛ in. to 1½ in., incl. 59.0
1⅝ in. and larger.. 53.5
Semifinished Hex Nuts, Reg. (Incl. Slotted):
⅝ in. and smaller.. 60.5
¾ in. to 1 in., incl 63.0
1⅛ in. to 1½ in., incl. 59.0
1⅝ in. and larger.. 53.5

CAP AND SETSCREWS

(Base discounts, packages, per cent off list, f.o.b. mill)
Hex Head Capscrews, Coarse or Fine Thread, Bright:
6 in. and shorter:
⅝ in. and smaller.. 40.0
¾, ⅞, and 1 in. diam. 22.0
Longer than 6 in.:
⅝ in. and smaller.. 8.0
¾, ⅞, and 1 in. diam. .... +6.0
High Carbon, Heat Treated:
6 in. and shorter:
⅝ in. and smaller.. 26.0
¾, ⅞, and 1 in. diam. 3.0
Longer than 6 in.:
⅝ in. and smaller..+13.0
¾, ⅞, and 1 in. diam. ....+32.0
Flat Head Capscrews:
¾ in. and smaller..+76.0
Setscrews, Square Head, Cup Point, Coarse Thread:
Through 1 in. diam.:
6 in. and shorter... Net
Longer than 6 in...+23

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.
Structural ½ in., larger 12.25
$\frac{7}{16}$ in. under: List less 19%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft. mill; minimum wall thickness, cut lengths 10 to 24 ft. inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	25.98	23.54
1¼	13	....	30.78	23.36
1½	13	29.03	34.01	25.83
1¾	13	34.29	40.18	30.51
2	13	38.44	45.05	34.20
2¼	13	43.29	50.75	38.52
2¼	12	46.99	55.06	41.81
2½	12	51.76	60.65	46.05
2¾	12	56.04	65.67	49.88
3	12	59.76	70.03	53.19

RAILWAY MATERIALS

RAILS	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.525	5.425	....	6.50
Ensley,Ala. T2	5.525	5.425	....	6.50
Fairfield,Ala. T2	....	....	....	6.50
Gary,Ind. U5	5.525	5.425	....	...
Huntington,W.Va. C15	....	....	....	6.50
IndianaHarbor,Ind. I-2	5.525	5.425	5.475	...
Johnstown,Pa. B2	....	....	...(16)	6.50
Lackawanna,N.Y. B2	5.525	5.425	....	6.50
Minnequa,Colo. C10	5.525	5.425	....	7.00
Steelton,Pa. B2	5.525	5.425	....	...
Williamsport,Pa. S19	....	....	....	6.50

TIE PLATES
Fairfield,Ala. T2 ......6.60
Gary,Ind. U5 ....6.60
Ind.Harbor,Ind. I-2 ....6.60
Lackawanna,N.Y. B2 ..6.60
Minnequa,Colo. C10 ....6.60
Seattle B3 ....6.75
Steelton,Pa. B2 ....6.60
Torrance,Calif. C11 ....6.75

JOINT BARS
Bessemer,Pa. U5 ......6.975
Fairfield,Ala. T2 .....6.975
Ind.Harbor,Ind. I-2 ...6.975
Joliet,Ill. U5 ....6.975
Lackawanna,N.Y. B2..6.975
Minnequa,Colo. C10 ...6.975
Steelton,Pa. B2 ......6.975

AXLES
Ind.Harbor,Ind. S13 ...8.775
Johnstown,Pa. B2 ....8.775

TRACK BOLTS, Untreated
Cleveland R2 ....14.75
KansasCity,Mo. S5 ....14.75
Lebanon,Pa. B2 ......14.75
Minnequa,Colo. C10 ...14.75
Pittsburgh P14 ....14.75
Seattle B3 ....15.25

SCREW SPIKES
Lebanon,Pa. B2 ......14.50

STANDARD TRACK SPIKES
Fairfield,Ala. T2 ......9.75
Ind.Harbor,Ind. I-2, Y1.9.75
KansasCity,Mo. S5 ....9.75
Lebanon,Pa. B2 ....9.75
Minnequa,Colo. C10 ....9.75
Pittsburgh J5 ....9.75
Seattle B3 ....10.25
S.Chicago,Ill. R2 ......9.75
Struthers,O. Y1 ....9.75
Youngstown R2 ....9.75

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 13 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn. base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.15c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 6.045c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.60c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(44) To fabricators.
(45) 0.022 in. and lighter, over 0.022", 8.20c.
(46) Special quality.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds; 9.30c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25
Ambridge, Pa. N2	+9.25	....	+2.75	....	+0.25	....	1.25	....	1.25	....	1	....	3.5	....
Lorain, O. N3	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25
Youngstown Y1	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25

ELECTRIC STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

	2		2½		3		3½		4		5		6	
Youngstown R2	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Alton, Ill. L1	....	....	....	....	....	....	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Benwood, W. Va. W10	4.5	+22	+7.5	+31	+18	+39.5	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Butler, Pa. F6	5.5	+21	+6.5	+30	+17	+38.5	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Fairless, Pa. N3	....	....	....	....	....	....	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Fontana, Calif. K1	....	....	....	....	....	....	+8.25	+23.5	+5.25	+19.5	+1.75	+15	0.75	+14.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	4.25	+11	7.25	+7	10.75	+2.5	13.25	+3.25
Lorain, O. N3	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Sharon, Pa. S4	5.5	+21	+6.5	+30	+17	+38.5	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Sparrows Pt., Md. B2	3.5	+23	8.5	+32	+19	+40.5	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Wheatland, Pa. W9	5.5	+21	+6	+30	+17	+38.5	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Youngstown R2, Y1	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Alton, Ill. L1	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	....	....	....	....
Benwood, W. Va. W10	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Etna, Pa. N2	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Fairless, Pa. N3	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	4.25	+12.5	4.25	+12.5
Fontana, Calif. K1	1.25	+13.25	1.75	+12.75	3.25	+13	3.25	+13	+7.25	+24	+7.25	+24
Indiana Harbor, Ind. Y1	13.75	+0.75	14.25	+0.25	15.75	+0.5	15.25	+0.5	5.25	+11.5	5.25	+11.5
Lorain, O. N3	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Sharon, Pa. M6	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Sparrows Pt., Md. B2	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	4.25	+12.5	4.25	+12.5
Wheatland, Pa. W9	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Youngstown R2, Y1	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5

*Galvanized pipe discounts based on current price of zinc (10.00c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.00	27.00	....	36.00	....	42.00	44.25	48.50	45.00
202	23.75	30.25	36.50	39.00	40.75	43.00	45.00	49.25	49.25
301	23.25	28.00	37.25	37.25	42.00	44.25	46.25	51.25	47.50
302	25.25	31.50	38.00	40.50	42.75	45.00	47.25	52.00	52.00
302B	25.50	32.75	40.75	45.75	45.00	47.25	49.50	57.00	57.00
303	....	32.00	41.00	....	45.50	48.00	50.00	56.75	56.75
304	27.00	33.25	40.50	44.25	45.25	47.75	50.75	55.50	55.50
304L	....	....	48.25	51.50	53.00	55.50	58.50	63.25	63.25
305	28.50	36.75	42.50	47.50	45.25	47.75	51.25	58.75	58.75
308	30.75	38.25	47.25	50.25	52.75	55.75	60.25	63.00	63.00
309	39.75	49.50	57.75	64.50	63.75	67.00	71.00	80.50	80.50
310	49.75	61.50	78.00	84.25	86.50	91.00	92.75	96.75	96.75
314	....	....	....	....	86.50	....	92.75	....	104.50
316	39.75	49.50	62.25	69.25	69.25	73.00	76.75	81.50	81.50
316L	....	....	70.00	76.50	77.00	80.75	84.50	89.25	89.25
317	48.00	60.00	76.75	88.25	86.25	90.75	93.50	101.00	101.00
321	32.25	40.00	47.00	53.50	52.50	55.50	59.75	65.50	65.50
330	....	....	106.75	....	106.75	106.75	105.50	108.00	149.25
18-8 CbTa	37.00	46.50	55.75	63.50	61.50	64.75	69.75	79.25	79.25
403	....	....	32.00	....	35.75	37.75	40.25	48.25	48.25
405	19.50	25.50	29.75	36.00	33.50	35.25	37.50	46.75	46.75
410	16.75	21.50	28.25	31.00	32.00	33.75	35.00	40.25	40.25
416	....	....	28.75	....	32.50	34.25	36.25	48.25	48.25
420	....	33.50	34.25	41.75	39.25	41.25	45.25	62.00	62.00
430	17.00	21.75	28.75	32.00	32.50	34.25	36.00	40.75	40.75
430F	....	....	29.50	....	33.00	34.75	36.75	51.75	51.75
431	....	28.75	37.75	....	42.00	44.25	46.00	56.00	56.00
446	....	....	39.25	59.00	44.25	46.50	47.75	70.00	70.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Div., H. K. Porter Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; G. O. Carlson Inc.; Charter Wire Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Elwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Jones & Laughlin Steel Corp.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McInnes Steel Co.; McLouth Steel Corp.; Metal Forming Corp.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Stainless Steel Div., Jones & Laughlin Steel Corp.; Superior Steel Corp.; Superior Tube Co.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	—Plates— Carbon Base 5%	10%	15%	20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	34.70	37.95	42.25	46.70	40.00
304L	36.90	40.55	45.10	49.85	....
316	40.35	44.40	49.50	54.50	58.75
316L	45.05	49.35	54.70	60.10	....
316 Cb	47.30	53.80	61.45	69.10	....
321	36.60	40.05	44.60	49.30	47.25
347	38.25	42.40	47.55	52.80	57.00
405	28.60	29.85	33.35	36.85	....
410	28.15	29.55	33.10	36.70	....
430	28.30	29.80	33.55	37.25	....
Inconel	48.90	59.55	70.15	80.85	....
Nickel	41.65	51.95	62.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.05	....
Copper*	....	....	....	....	46.00

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	33.95	40.25

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.305	Cr Hot Work	0.510
Extra Carbon	0.360	W-Cr Hot Work	0.500
Special Carbon	0.475	V-Cr Hot Work	0.475
Oil Hardening	0.475	Hi-Carbon-Cr	0.830

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	...	4.285
18.25	4.25	1	4.75	...	2.500
18	4	2	9	...	2.870
18	4	2	....	...	1.960
18	4	1	....	...	1.795
9	3.5	..	....	...	1.395
13.5	4	3	....	...	2.060
13.75	3.75	2	5	...	2.440
6.4	4.5	1.[illegible]	....	5	1.300
6	4	3	....	6	1.545
1.5	4	1	....	8.5	1.155

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal transportation tax.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
AlabamaCity,Ala. R2	62.00	62.50	....	....
Birmingham R2	62.00	62.50‡	....	....
Birmingham U6	....	62.50‡	66.50	....
Woodward,Ala. W15	62.00**	62.50‡	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N.Tonawanda,N.Y. T9	....	66.50	67.00	67.50
Tonawanda,N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester,N.Y., deld.	69.02	69.52	70.02	....
Syracuse,N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S.Chicago,Ill. R2	66.00	....	66.50	....
S.Chicago,Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	68.62	69.12	69.12	69.62
Muskegon,Mich., deld.	....	74.12	74.12	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron,O., deld.	69.12	69.62	69.62	70.12
Mid-Atlantic District				
Birdsboro,Pa. B10	68.00	68.50	69.00	69.50
Chester,Pa. P4	66.50	67.00	67.50	....
Swedeland,Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.10	75.60	....
Newark,N.J., deld.	72.29	72.79	73.29	73.79
Philadelphia, deld.	70.01	70.51	71.01	71.59
Troy,N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
NevilleIsland,Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKeesRocks,Pa., deld.	....	67.60	67.60	68.13
Lawrenceville,Homestead, Wilmerding,Monaca,Pa., deld.	....	68.26	68.26	68.79
Verona,Trafford,Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge,Pa., deld.	68.60	69.10	69.10	69.63
Midland,Pa. C18	66.00	....	....	....

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Youngstown District				
Hubbard,O. Y1	....	....	66.50	....
Sharpsville,Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	67.00
Mansfield,O., deld.	70.90	....	71.40	71.90
Duluth I-3	66.00	66.50	66.50	67.00
Erie,Pa. I-3	66.00	66.50	66.50	67.00
Everett,Mass. E1	67.50	68.00	68.50	....
Fontana,Calif. K1	75.00	75.50	....	....
Geneva,Utah C11	66.00	66.50	....	....
GraniteCity,Ill. G4	67.90	68.40	68.90	....
Ironton,Utah C11	66.00	66.50	....	....
Minnequa,Colo. C10	68.00	68.50	69.00	....
Rockwood,Tenn. T3	....	62.50‡	66.50	....
Toledo,O. I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.54	73.04	....	....

**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
‡Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.
Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.
Nickel: Under 0.50% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson,O. I-3, J1	78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity,Ky. P15	$99.00
NiagaraFalls,N.Y. P15	99.00
Keokuk,Iowa Open-hearth & Fdry, $9 freight allowed K2	103.50
Keokuk,Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, max fr'gt allowed up to $9, K2	106.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$78.50
Troy,N.Y. R2 (Phos. 0.035% max)	74.00
Philadelphia, deld.	82.27
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Chattanooga, Houston, Seattle no charge.

	SHEETS				STRIP	BARS				PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††[5]	Standard Structural Shapes	Carbon	Floor
Atlanta	8.59§	9.86§	....	....	8.64	9.01	10.68	....	9.05	8.97	10.90
Baltimore	8.28	8.88	9.76	....	8.76	9.06	11.34#	15.18	9.19	8.66	10.14
Birmingham	8.18	9.45	11.07	....	8.23	8.60	10.57	....	8.64	8.56	10.70
Boston	9.38	10.44	11.45	....	9.42	9.73	12.90#	15.28	9.63	9.72	11.20
Buffalo	8.40	9.00	10.07	....	8.50	8.80	10.90#	15.00	8.90	8.90	10.45
Chattanooga	8.35	9.69	9.65	....	8.40	8.77	10.46	....	8.88	8.80	10.66
Chicago	8.20	9.45	10.00	....	8.23	8.60	8.80	14.65	8.64	8.56	9.88
Cincinnati	8.34	9.48	10.05	....	8.54	8.92	9.31	14.96	9.18	8.93	10.21
Cleveland	8.18	9.45	9.95	....	8.33	8.69	10.80#	14.74	9.01	8.79	10.11
Denver	9.38	11.75	....	....	9.41	9.78	11.10	....	9.82	9.74	11.06
Detroit	8.43	9.70	10.35	....	8.58	8.90	9.15	14.91	9.18	8.91	10.13
Erie, Pa.	8.20	9.45	9.95[10]	....	8.50	8.75	9.05[10]	....	9.00	8.85	10.10
Houston	8.45	9.75	8.45	....	8.60	9.05	11.10	....	9.10	9.05	10.30
Jackson, Miss.	8.52	9.79	....	....	8.57	8.94	10.68	....	8.97	8.90	10.74
Los Angeles	9.50	10.75	11.65	....	9.55	9.55	12.75	16.00	9.60	9.55	11.70
Milwaukee	8.33	9.58	10.13	....	8.36	8.73	9.03	14.78	8.85	8.69	10.01
Moline, Ill.	8.55	9.80	10.35	....	8.58	8.95	9.15	....	8.99	8.91	....
New York	8.87	10.13	10.56	....	9.31	9.57	12.76#	15.09	9.35	9.43	10.71
Norfolk, Va.	8.05	....	....	....	8.55	8.60	10.80	....	8.95	8.45	9.95
Philadelphia	8.00	8.90	9.87	51.94	8.69	8.65	11.51#	15.01	8.50	8.77	9.77**
Pittsburgh	8.18	9.45	10.35	50.00	8.33	8.60	10.80#	14.65	8.64	8.56	9.88
Portland, Oreg.	8.50	11.20	11.55	57.20	11.35‡‡	8.65	14.65#	15.95	9.60	8.30	12.50
Richmond, Va.	8.45	....	10.40	....	9.15	9.15	....	....	9.40	8.85	10.35
St. Louis	8.54	9.79	10.36	....	8.59	8.97	9.41	15.01	9.10	8.93	10.25
St. Paul	8.79	10.04	10.61	....	8.84	9.36	9.66	....	9.38	9.30	10.49
San Francisco	9.35	10.75	11.00	54.85	9.45	9.70	13.00	16.00	9.50	9.60	12.00
Seattle	9.95	11.15	12.00	57.20	10.00	10.80	14.05	16.35	9.80	9.70	12.10
Spokane, Wash.	9.95	11.15	12.00	....	10.00	10.10	14.05	17.20	9.80	9.70	12.10
Washington	8.48	9.58	....	....	9.06	9.15	9.73	....	9.35	8.86	10.36

*Prices do not include gage extras; †prices include gage and coating extras; ‡includes 35-cent bar quality extras; §42 in. and under; **⅛ in. and heavier; ††as annealed; ‡‡over 4 in.; §§over 3 in.; #1 in. round C-1018.

Base quantities, 2000 to 4999 lb except as noted; cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, Portland, Oreg. 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Portland, Oreg., 1000 to 9999 lb; [3]—400 to 9999 lb; [5]—1000 to 1999 lb; [8]—2000 to 3999 lb; [10]—2000 lb and over.

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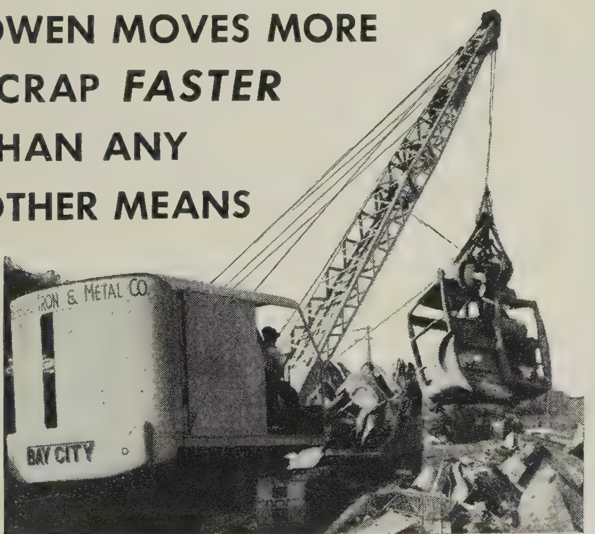

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Precision Ball-lok pins assure quick and safe engine installations for maintenance crews. Photograph through the courtesy of Republic Aircraft Corp.

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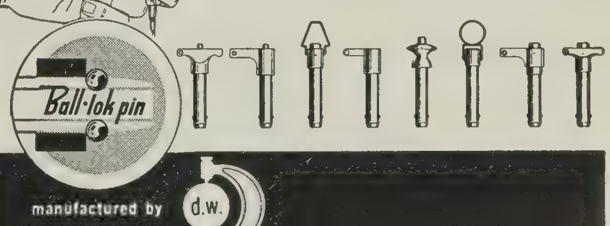
Whenever units are frequently assembled or disassembled the one operation Ball-lok pins assure you of *accident proof safety* . . . the operator must apply thumb pressure to the release button to pull pin. *Simplicity* . . . the one operation pins have less moving parts — completely eliminates all need of nuts, bolts, washers, clevis pins or other retaining items. Built in *strength* through simplicity of construction and the finest materials and workmanship. Ball-lok pins have met the most exacting requirements of aircraft manufacturers and military procurement. Available in most diameters and lengths of standard bolt sizes or manufactured to your specifications.

WRITE FOR ILLUSTRATED BROCHURE 603 ON ALL STANDARD MODELS.



manufactured by d.w. price corporation

1161 West Pico Blvd., Los Angeles 64

national sales representatives ROWE SALES CO.

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $135; Salina, Pa., $140; Niles, O., $138; Cutler, Utah, $165.
Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, $175; Stevens Pottery, Ga., $185; Cutler, Utah, $233.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, O., Hawstone, Pa., $150; Warren, Niles, Windham, O., Hays, Latrobe, Morrisville, Pa., $155; E. Chicago, Ind., Joliet, Rockdale, Ill., $160; Lehigh, Utah, $175; Los Angeles, $180.
Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $157; Morrisville, Hays, Latrobe, Pa., $160; E. Chicago, Ind., $167; Curtner, Calif., $182.

Silica Brick (per 1000)

Clearfield, Pa., $140; Philadelphia, $137; Woodbridge, N. J., $135.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, O., $96.75; Clearfield, Pa., Portsmouth, O., $102.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $235; Danville, Ill., $238; Philadelphia, Clearfield, Pa., $230; Orviston, Pa., $245.
60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $295; Danville, Ill., $298; Philadelphia, Clearfield, Orviston, Pa., $305.
70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $335; Danville, Ill., $338; Philadelphia, Clearfield, Orviston, Pa., $345.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $188.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, O., $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, bulk ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore, $73.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-41; 70%, $36.40; 60%, $33-36.50. Imported, net tons, f.o.b. cars point of entry duty paid, metallurgical grade: European, $33-34; Mexican, all-rail, duty paid, $25.25-25.75; barge, Brownsville, Tex., $27.25-27.75.

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, Swedish:	
Deld. east of Mississippi River, ocean bags 23,000 lb and over	10.50
F.o.b. Riverton or Camden, N. J., west of Mississippi River	9.50
Sponge Iron, Domestic, 98 + % Fe:	
Deld. east of Mississippi River, 23,000 lb and over	10.50
F.o.b. Riverton, N. J., west of Mississippi River	9.50
Electrolytic Iron:	
Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	28.00
Annealed, 99.5% Fe	36.50
Unannealed (99 + % Fe)	36.00
Unannealed (99 + % Fe) (minus 325 mesh)	59.00
Powder Flakes (minus 16, plus 100 mesh)	29.00
Carbonyl Iron: 98.1-99.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum:	
Atomized, 500 lb drum, frght allowed	
Carlots	39.50
Ton lots	41.50
Antimony, 500 lb lots	42.00*
Brass, 5000-lb lots	31.30-38.40†
Bronze, 5000-lb lots	48.10-52.70†
Copper:	
Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese:	
Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel unannealed	$1.15
Nickel-Silver, 5000-lb lots	49.20-61.30†
Phosphor-Copper, 5000-lb lots	59.80
Copper (atomized) 5000-lb lots	40.30-48.80‡
Silicon	47.50
Solder	7.00*
Stainless Steel, 304	$1.02
Stainless Steel, 316	$1.20
Tin	14.50*
Zinc, 5000-lb lots	17.50-30.70‡
Tungsten:	Dollars
Melting grade, 99% 60 to 2000 mesh:	
1000 lb and over	3.15
Less than 1000 lb	3.30
Chromium, electrolytic 99.8% Cr min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Inches Length	Per 100 lb
2	24	$60.75
2½	30	39.25
3	40	37.00
4	40	35.00
5⅛	40	34.75
6	60	31.50
7	60	28.25
8, 9, 10	60	28.00
12	72	26.75
14	60	26.75
16	72	25.75
17	60	26.25
18	72	26.25
20	72	25.25
24	84	26.00

CARBON

Inches Diam	Inches Length	Per 100 lb
8	60	13.30
10	60	13.00
12	60	12.95
14	60	12.85
14	72	11.95
17	60	11.85
17	72	11.40
20	84	11.40
20	90	11.00
24	72, 84	11.25
24	96	10.95
30	84	11.05
40, 35	110	10.70
40	100	10.70

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$6.30	$6.25	$6.25	$6.50
Bar Size Angles	6.62	6.57	6.57	6.75
Structural Angles	6.62	6.57	6.57	6.75
I-Beams	6.87	6.82	6.82	7.00
Channels	6.87	6.82	6.82	7.00
Plates (basic bessemer)	8.35	8.30	8.30	8.60
Sheets, H.R.	8.25	8.20	8.20	8.50
Sheets, C.R. (drawing quality)	9.00	8.95	8.95	9.25
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	26.79	26.67	26.67	27.36
Barbed Wire (†)	6.95	6.95	6.95	7.40
Merchant Bars	6.87	6.82	6.82	7.22
Hot-Rolled Bands	7.20	7.15	7.15	7.55
Wire Rods, Thomas Commercial No. 5	6.73	6.73	6.73	7.13
Wire Rods, O.H. Cold Heading Quality No. 5	7.07	7.07	7.07	7.47
Bright Common Wire Nails (§)	8.38	8.38	8.38	8.58

†Per 82 lb, net, reel. §Per 100-lb kegs, 20d nails and heavier.

Ores

Lake Superior Iron Ore

(Prices effective for the 1957 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 30, 1957, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, foundry and basic 62-64% concentrates	25.00-27.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	27.00-27.50
N. African hematite (spot)	nom.
Brazilian iron ore, 68-69%	*28.00*

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	*$13.50-14.25**
Domestic, concentrates f.o.b. milling points	*20.00-22.00*

*Before duty.

Manganese Ore

Mn 46-48%, Indian (export tax included), $1.35-1.40 per long ton unit, c.i.f. U. S. ports, duty for buyer's account: other than Indian, $1.35-1.40; contracts by negotiation.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	*$51.00-53.00*
48% 2.8:1	*48.00-50.00*
48% no ratio	*41.00-43.00*

South African Transvaal

48% no ratio	*$40.00-43.00*
44% no ratio	*30.00-30.50*

Turkish

48% 3:1	*$59.00*

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked $1.18

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	*$2.50-2.60*
60-65%	*2.60-2.90*

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.75
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry Coke

Birmingham, ovens	$28.85
Cincinnati, deld.	31.84
Buffalo, ovens	30.50
Camden, N. J., ovens	29.50
Detroit, ovens	30.50
Pontiac, Mich., deld.	32.25
Saginaw, Mich., deld	33.83
Erie, Pa., ovens	30.50
Everett, Mass., ovens	
New England, deld.	31.55*
Indianapolis, ovens	29.75
Ironton, O., ovens	29.00
Cincinnati, deld.	31.84
Kearny, N. J., ovens	29.75
Milwaukee, ovens	30.50
Painesville, O., ovens	30.50
Cleveland, deld.	32.69
Philadelphia, ovens	29.50
St. Louis, ovens	31.50
Neville Island (Pittsburgh), Pa., ovens	29.25
St. Paul, ovens	29.75
Chicago, deld.	33.24
Swedeland, Pa., ovens	29.50
Terre Haute, Ind., ovens	29.75

*Or within $4.85 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	29.50
Industrial xylene	32.00-34.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx). Base price per net ton; $245, Johnstown, Duquesne, Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74% respectively.

(Mn 79-81%). Lump $263 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-90%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.03% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn, packed, carload 26.8c, ton lot 28.4c, less ton 29.6c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2%). Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lot 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 34c; 2000 lb to min carload, 36c; 500 lb to 1999 lb, 38c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 12.8c per lb of alloy. Packed, c.l. 14c, ton 14.45c, less ton 15.45c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l. lump, bulk 28.75c per lb of contained Cr; c.l. packed 30.30c, ton lot 32.05c; less ton 33.45c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk. C 0.025% max, 36.75c per lb contained Cr; 0.010% max, 37.75c. Ton lot, add 3.5c; less ton, add 5.2c. Delivered.
Cr 67-71%, carload, lump, bulk. C 0.02% max, 41.00c per lb contained Cr; 0.025% max, 39.75c; 0.05% max, 39.00c; 0.10% max, 38.50c; 0.20% max, 38.25c; 0.50% max, 38.00c; 1.0% max, 37.75c; 1.5% max, 37.50c; 2.0% max, 37.25c. Ton lot, add 3.4c; less ton lot, add 5.1c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l., 2 in. x D, bulk 30.05c per lb of contained Cr. Packed, c.l. 31.65c, ton 33.45c, less ton 34.95c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, 8M x D, 21.25c, per lb of alloy, ton lot 22.50c; less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max or Cr 33-36%, Si 45-48%, C 0.05% max. Carload, lump, bulk. 3" x down and 2" x down, 27.50c per lb contained Cr, 14.20c per lb contained Si. 0.75" x down, 28.65c per lb contained Cr, 14.20c per lb contained Si. Delivered.

Chromium Metal Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about ⅛" thick) $1.29 per lb, ton lot $1.31, less ton lot $1.33. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract less carload lot, packed $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 14.20c per lb of contained Si. Packed c.l. 16.70c, ton lot 18.15c, less ton 19.80c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 15.25c per lb contained silicon. Packed, c.l. 17.25c, ton lot 19.05c; less ton 20.4c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 16.4c per lb of contained Si. Packed, c.l. 18.30c, ton lot 19.95c, less ton 21.2c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 19.5c per lb of contained Si. Packed, c.l. 21.15c, ton lot 22.55c, less ton 23.6c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 0.75% max Fe, 0.07% max Ca). C.l. lump, bulk, 22.00c per lb of Si. Packed, c.l. 23.65c, ton lot 24.95c, less ton 25.95c. Add 0.5c for max 0.03% Ca grade. Deduct 0.5c for max 1% Fe grade analyzing min 99.75% Si; 0.75c for max 1.25% Fe grades analyzing min 96.75% Si. Spot, add 0.25c.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy; ton lot, packed, 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 27.25c per lb of alloy, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Bortam: (B 1.5-1.9%). Ton lot, 45c per lb; less than ton lot, 50c per lb.

Carbortam: (1 to 2%). Contract, lump, carload 9.50c per lb f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3⅜ lb each and containing 2 lb of Cr). Contract, carload, bulk 19.60c per lb of briquet, carload packed in box pallets 19.80c, in bags 20.70c; 3000 lb to c.l. in box pallets 21.00c; 2000 lb to c.l. in bags, 21.90c; less than 2000 lb in bags 22.80c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Contract, carload, bulk 14.8c per lb of briquet; c.l., packed, pallets 15c, bags 16c; 3000 lb to c.l., pallets 16.2c; 2000 lb to c.l. bags, 17.2c; less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). Contract, c.l. bulk 15.1c per lb of briquet; c.l. packed, pallets, 15.3c; bags 16.3c, 3000 lb to c.l., pallets, 16.5c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si). Contract, carload, bulk 7.7c per lb of briquet; packed, pallets, 7.9c; bags 8.9c; 3000 lb to c.l., pallets 9.5c; 2000 lb to c.l. bags 10.5c; less ton 11.4c. Delivered. Spot, add 0.25c. (Small size—weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 7.85c. Packed, pallets 8.05c; bags 9.05c; 3000 lb to c.l. pallets 9.65c; 2000 lb to c.l. bags 10.65c; less ton 11.55c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.41 per pound of Mo contained, f.o b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.95 per lb of contained W; 2000 lb W to 5000 lb W, $3.05; less than 2000 lb W, $3.17. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot 2" x D, $4.90 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lot 2" x D, $4.25 per lb of contained Cb plus Ta, delivered; less ton lot $4.30.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5.7%, Fe 20% approx). Contract, c.l. packed ½-in. x 12 M 20.00c per lb of alloy, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5.7%, Ti 9-11%). C.l. packed, 19c per lb of alloy, ton lot 20.15c; less ton lot 21.4c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.1c per lb of alloy; ton lot 19.55c; less ton lot 20.8c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk 18.50c. Packed c.l. 19.50c, 2000 lb to c.l. 20.50c, less than 2000 lb 21c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works. Mt. Pleasant, Siglo, Tenn., $110 per gross ton.

Ferromolybdenum: (55-75%). Per lb of contained Mo, in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.68 in all sizes except powdered which is $1.74.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans, $1.39; in bags, $1.38, f.o.b. Langeloth and Washington, Pa.

Scrap Is Not Yet Bumping Bottom

Sharp decline in prices continues for tenth consecutive week. STEEL's index on the prime grade drops another $1. The $36.83 level is the lowest in more than two years

Scrap Prices, Page 280

Pittsburgh — Prices on leading scrap grades dipped again last week, following reports that No. 2 bundles are selling at $30 and $31 a ton. The effect of these sales was to lower the nominal No. 1 heavy melting price by $1.

Philadelphia—Due mainly to a general marking of time by buyers and sellers, domestic scrap prices for the first time in recent weeks showed little change. No. 1 heavy melting is higher at $37.50-$39, delivered, with the outside figure representing a purchase by a mill within cometitive range of the export market. Heavy turnings are lower at $33.50, off 50 cents a ton.

New York — Brokers have reduced their buying prices due to lagging demand. No. 1 heavy melting and No. 1 bundles are down $2 to a range of $35-$36, and No. 2 heavy melting is off more than $2 to $29-$31. No. 2 bundles have dropped $1 to $24-$25. Unstripped motor blocks are quoted $32-$33, and heavy breakable cast $34-$35.

Chicago—Weakness continues in the scrap market here, and prices on leading grades are off another $1 to $4 a ton. Mill buying is extremely sparse, and a transaction as small as 500 tons becomes significant in determining prices. Generally, broker buying to fulfill outstanding orders is the only market indicator. With material not moving, dealers are unable to reduce their yard stocks and are fearful of increasing them. Consumers have generous inventories, and with the steelmaking rate failing to register the anticipated fourth quarter upturn, they are extremely selective in making purchases.

Cleveland—With the steel mills sitting on the sidelines, the scrap market here lacks activity. Quoted prices are nominal in the absence of a representative buy. Although No. 1 heavy melting is quoted at $32-$33, some consumers think they could get a price under that level if they entered the market for sizable tonnages. Expectations are automotive lists will go at prices substantially under those of a month ago when they close this week.

Youngstown—Scrap prices here are nominal and lower with no mill buying in sight. The mills are reported piling home scrap and some industrial material. The sluggish market is discouraging collection by peddlers.

Detroit — Pessimism prevails among local scrap dealers and brokers. Local dealers think the market is in for another slide, having heard that industrial bundles sold elsewhere for $24.

Yards are full and docks in Detroit and Saginaw, Mich., are

(*Please turn to Page* 285)

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, Oct. 23, 1957. Changes *shown in italics.*

STEELMAKING SCRAP COMPOSITE

Oct. 23	$36.83
Oct. 16	37.83
Sept. Avg.	47.73
Oct. 1956	57.27
Oct. 1952	43.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*37.00-38.00*
No. 2 heavy melting	33.00-34.00
No. 1 factory bundles	43.00-44.00
No. 1 dealer bundles	*37.00-38.00*
No. 2 bundles	*30.00-31.00*
No. 1 busheling	*37.00-38.00*
Machine shop turnings	20.00-21.00
Mixed borings, turnings	20.00-21.00
Short shovel turnings	23.00-24.00
Cast iron borings	23.00-24.00
Cut structurals:	
2 ft and under	*44.00-45.00*
3 ft lengths	*43.00-44.00*
Heavy turnings	*35.00-36.00*
Punchings & plate scrap	44.00-45.00
Electric furnace bundles	44.00-45.00

Cast Iron Grades

No. 1 cupola	*42.00-43.00*
Stove plate	*36.00-37.00*
Unstripped motor blocks	*29.00-30.00*
Clean auto cast	*45.00-46.00*
Drop broken machinery	*54.00-55.00*

Railroad Scrap

No. 1 R.R. heavy melt.	41.00-42.00
Rails, 2 ft and under	*61.00-62.00*
Rails, 18 in. and under	*62.00-63.00*
Angles, splice bars	55.00-56.00
Rails, rerolling	*61.00-62.00*

Stainless Steel Scrap

18-8 bundles & solids	210.00-215.00
18-8 turnings	115.00-120.00
430 bundles & solids	95.00-100.00
430 turnings	65.00-70.00

CLEVELAND

No. 1 heavy melting	*32.00-33.00*
No. 2 heavy melting	*25.00-26.00*
No. 1 factory bundles	*35.00-36.00*
No. 1 bundles	*32.00-33.00*
No. 2 bundles	*22.00-23.00*
No. 1 busheling	*32.00-33.00*
Machine shop turnings	*12.00-13.00*
Short shovel turnings	*16.00-17.00*
Mixed borings, turnings	*16.00-17.00*
Cast iron borings	*16.00-17.00*
Cut foundry steel	*34.00-35.00*
Cut structurals, plates 2 ft and under	*39.00-40.00*
Low phos. punchings & plate	*33.00-34.00*
Alloy free, short shovel turnings	*22.00-23.00*
Electric furnace bundles	*33.00-34.00*

Cast Iron Grades

No. 1 cupola	*42.00-43.00*
Charging box cast	*34.00-35.00*
Heavy breakable cast	*32.00-33.00*
Stove plate	*40.00-41.00*
Unstripped motor blocks	*27.00-28.00*
Brake shoes	*31.00-32.00*
Clean auto cast	*42.00-43.00*
Burnt cast	*29.00-30.00*
Drop broken machinery	*46.00-47.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*37.00-38.00*
R.R. malleable	*53.00-54.00*
Rails, 2 ft and under	*60.00-61.00*
Rails, 18 in. and under	*61.00-62.00*
Rails, random lengths	*55.00-56.00*
Cast steel	*52.00-53.00*
Railroad specialties	*52.00-53.00*
Uncut tires	*47.00-48.00*
Angles, splice bars	*52.00-53.00*
Rails, rerolling	*60.00-61.00*

Stainless Steel
(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	*210.00-215.00*
18-8 turnings	*110.00-115.00*
430 clips, bundles, solids	75.00-80.00
430 turnings	40.00-50.00

YOUNGSTOWN

No. 1 heavy melting	*35.00-36.00*
No. 2 heavy melting	*30.00-31.00*
No. 1 bundles	*35.00-36.00*
No. 2 bundles	*27.00-28.00*
No. 1 busheling	*35.00-36.00*
Machine shop turnings	*14.00-15.00*
Short shovel turnings	*18.00-19.00*
Cast iron borings	*18.00-19.00*
Low phos.	*38.00-39.00*
Electric furnace bundles	*38.00-39.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*40.00-41.00*

CHICAGO

No. 1 heavy melt., indus.	*36.00-37.00*
No. 1 hvy melt., dealer	*33.00-34.00*
No. 2 heavy melting	*29.00-30.00*
No. 1 factory bundles	*38.00-39.00*
No. 1 dealer bundles	*34.00-35.00*
No. 2 bundles	*21.00-22.00*
No. 1 busheling, indus.	*36.00-37.00*
No. 1 busheling dealer	*33.00-34.00*
Machine shop turnings	*17.00-18.00*
Mixed borings, turnings	*19.00-20.00*
Short shovel turnings	*19.00-20.00*
Cast iron borings	*19.00-20.00*
Cut structurals, 3 ft.	*40.00-41.00*
Punchings & plate scrap	*41.00-42.00*

Cast Iron Grades

No. 1 cupola	*35.00-36.00*
Stove plate	*34.00-35.00*
Unstripped motor blocks	*27.00-28.00*
Clean auto cast	*40.00-41.00*
Drop broken machinery	*40.00-41.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*39.00-40.00*
R.R. malleable	*47.00-48.00*
Rails, 2 ft and under	*51.00-52.00*
Rails, 18 in. and under	*52.00-53.00*
Angles, splice bars	*48.00-49.00*
Axles	*52.00-53.00*
Rails, rerolling	*52.00-53.00*

Stainless Steel Scrap

18-8 bundles & solids	205.00-215.00
18-8 turnings	105.00-115.00
430 bundles & solids	80.00-90.00
430 turnings	50.00-55.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*26.00-27.00†*
No. 2 heavy melting	*23.00-24.00†*
No. 1 bundles	*24.00-26.00†*
No. 2 bundles	*20.00-21.00†*
No. 1 busheling	*25.00-26.00†*
Machine shop turnings	*10.00-11.00†*
Mixed borings, turnings	*11.00-12.00†*
Short shovel turnings	*13.00-14.00†*
Punchings & plate scrap	*26.00-27.00†*

Cast Iron Grades

No. 1 cupola	*34.00†*
Stove plate	*29.00†*
Charging box cast	*28.00†*
Heavy breakable	*28.00†*
Unstripped motor blocks	*15.00†*
Clean auto cast	*35.00†*
Malleable	*36.00†*

†Nominal

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	39.00
No. 2 heavy melting	37.00
No. 1 bundles	39.00
No. 2 bundles	29.00
No. 1 busheling	39.00
Machine shop turnings	17.00
Short shovel turnings	19.00

Cast Iron Grades

No. 1 cupola	45.00
Charging box cast	37.00
Heavy breakable cast	37.00
Unstripped motor blocks	37.00
Brake shoes	40.00
Clean auto cast	46.00
Stove plate	39.00

Railroad Scrap

No. 1 R.R. heavy melt.	42.00
Rails, 18 in. and under	59.00
Rails, random lengths	52.00
Rails, rerolling	60.00
Angles, splice bars	52.00

PHILADELPHIA

No. 1 heavy melting	*37.00-39.00*
No. 2 heavy melting	33.50
No. 1 bundles	37.50-38.50
No. 2 bundles	27.50
No. 1 busheling	37.50-38.50
Electric furnace bundles	45.00
Mixed borings, turnings	23.00†
Short shovel turnings	25.00
Machine shop turnings	22.00†
Heavy turnings	*33.50*
Structurals & plate	46.00-48.00
Couplers, springs, wheels	56.00
Rail crops, 2 ft & under	68.00-69.00

Cast Iron Grades

No. 1 cupola	43.00
Heavy breakable cast	42.00
Malleable	59.00
Drop broken machinery	51.00-52.00

†Nominal

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*35.00-36.00*
No. 2 heavy melting	*29.00-31.00*
No. 1 bundles	*35.00-36.00*
No. 2 bundles	*24.00-25.00*
Machine shop turnings	12.00-13.00
Mixed borings, turnings	14.00-15.00
Short shovel turnings	16.00-17.00
Low phos. (structurals & plate	46.00-47.00†

Cast Iron Grades

No. 1 cupola	39.00-40.00
Unstripped motor blocks	*32.00-33.00*
Heavy breakable	*34.00-35.00*

Stainless Steel

18-8 sheets, clips, solids	175.00-185.00
18-8 borings, turnings	75.00-80.00
430 sheets, clips, solids	55.00-60.00
410 sheets, clips, solids	50.00-55.00

†Nominal

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*32.00-33.00*
No. 2 heavy melting	29.00-30.00
No. 1 bundles	*32.00-33.00*
No. 2 bundles	*27.00-28.00*
No. 1 busheling	32.00-33.00
Machine shop turnings	10.00-11.00
Mixed borings, turnings	11.00-12.00
Short shovel turnings	12.00-13.00
No. 1 cast	33.00-34.00
Mixed cupola cast	32.00-33.00
No. 1 machinery cast	38.00-39.00

BUFFALO

No. 1 heavy melting	*36.00-37.00*
No. 2 heavy melting	*32.50-33.50*
No. 1 bundles	*36.00-37.00*
No. 2 bundles	*29.50-30.50*
No. 1 busheling	*36.00-37.00*
Mixed borings, turnings	*21.00-22.00*
Machine shop turnings	*19.00-20.00*
Short shovel turnings	*22.00-23.00*
Cast iron borings	*21.00-22.00*
Low phos.	*41.00-42.00*

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	43.00-44.00
No. 1 machinery	47.00-48.00

Railroad Scrap

Rails, random lengths	*50.00-51.00*
Rails, 3 ft and under	*55.00-56.00*
Railroad specialties	*43.00-44.00*

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	36.00-37.00
No. 2 heavy melting	32.00-33.00
No. 1 bundles	36.00-37.00
No. 2 bundles	27.00-28.00
No. 1 busheling	36.00-37.00
Machine shop turnings	20.00-21.00
Mixed borings, turnings	21.00-22.00
Short shovel turnings	22.00-23.00
Cast iron borings	21.00-22.00
Low phos. 18 in.	43.00-44.00

Cast Iron Grades

No. 1 cupola	36.00-37.00
Heavy breakable cast	33.00-34.00
Charging box cast	33.00-34.00
Drop broken machinery	48.00-49.00

Railroad Scrap

No. 1 R.R. heavy melt.	39.00-40.00
Rails, 18 in. and under	62.00-63.00
Rails, random lengths	54.00-55.00

BIRMINGHAM

No. 1 heavy melting	36.00-37.00
No. 2 heavy melting	31.00-32.00
No. 1 bundles	36.00-37.00
No. 2 bundles	21.00-22.00
No. 1 busheling	36.00-37.00
Cast iron borings	*22.00-23.00*
Short shovel turnings	21.00-22.00
Machine shop turnings	21.00-22.00
Bar crops and plates	41.00-42.00
Structurals & plate	41.00-42.00
Electric furnace bundles	40.00-41.00
Electric furnace:	
3 ft and under	38.00-39.00
2 ft and under	39.00-40.00

Cast Iron Grades

No. 1 cupola	47.00-48.00
Stove plate	46.00-47.00
Unstripped motor blocks	38.00-39.00
Charging box cast	27.00-28.00
No. 1 wheels	39.00-40.00

Railroad Scrap

No. 1 R.R. heavy melt.	*37.00-38.00*
Rails, 18 in. and under	51.00-52.00
Rails, rerolling	55.00-56.00
Rails, random lengths	47.00-48.00
Angles, splice bars	*43.00-44.00*

SEATTLE

No. 1 heavy melting	35.00†
No. 1 bundles	33.00†
No. 2 heavy melting	33.00†
No. 2 bundles	22.00†
Machine shop turnings	*26.00*
Mixed borings, turnings	*26.00*
Electric furnace No. 1	*35.00†*

Cast Iron Grades

No. 1 cupola	35.00†
Heavy breakable cast	32.00†
Unstripped motor blocks	27.00†
Stove plate (f.o.b. plant)	25.00†

†Nominal

LOS ANGELES

No. 1 heavy melting	44.00
No. 2 heavy melting	42.00
No. 1 bundles	43.00
No. 2 bundles	34.00
Machine shop turnings	31.00
Shoveling turnings	30.00
Cast iron borings	30.00
Cut structurals and plate, 1 ft and under	58.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	54.00-56.00

Railroad Scrap

No. 1 R.R. heavy melt.	44.00

SAN FRANCISCO

No. 1 heavy melting	39.00
No. 2 heavy melting	37.00
No. 1 bundles	38.00
No. 2 bundles	30.00
Machine shop turnings	27.00
Mixed borings, turnings	27.00
Cast iron borings	27.00
Heavy turnings	27.00
Short shovel turnings	27.00
Cut structurals, 3 ft.	50.00

Cast Iron Grades

No. 1 cupola	50.00-52.00
Charging box cast	45.00
Stove plate	46.00
Heavy breakable cast	40.00
Unstripped motor blocks	40.00
Clean auto cast	50.00-52.00
No. 1 wheels	45.00
Drop broken machinery	50.00-52.00

HAMILTON, ONT.

No. 1 heavy melting	38.00
No. 2 heavy melting	33.00
No. 1 bundles	38.00
No. 2 bundles	28.00
Mixed steel scrap	33.00
Mixed borings, turnings	21.00
Busheling, new factory:	
Prepared	38.00
Unprepared	32.00
Short steel turnings	23.00
Rails, rerolling	47.00

Cast Iron Grades†

No. 1 machinery cast.	50.00

†F.o.b. Hamilton, Ont.

GREAT MOMENTS IN THE HISTORY OF IRON AND STEEL MAKING

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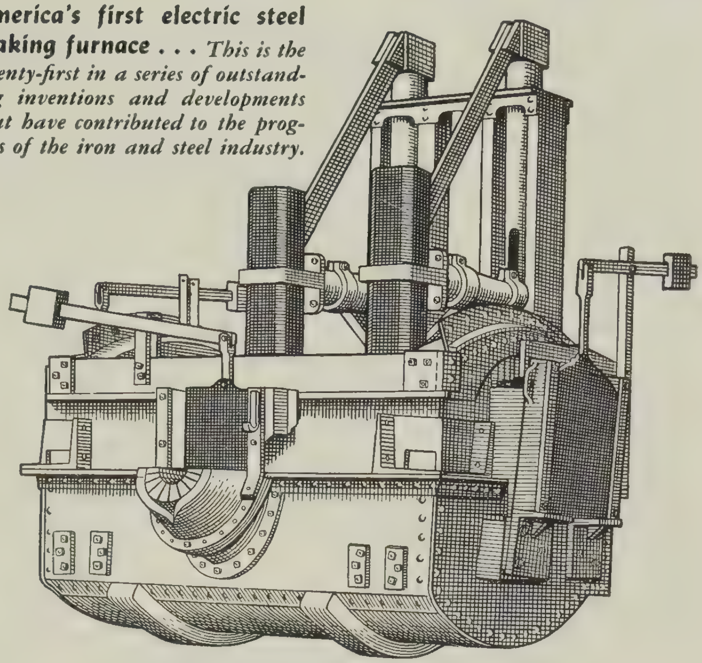
America's first electric steel making furnace . . . *This is the twenty-first in a series of outstanding inventions and developments that have contributed to the progress of the iron and steel industry.*



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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Imports Hurt Brass Mills

Disparity between U. S. and foreign wages allows overseas producers to undersell domestic prices by as much as 25 per cent. Copper, lead, and zinc remain weak

Nonferrous Metal Prices, Pages 284 & 285

IMPORTS OF BRASS mill products are seriously affecting domestic producers' shipments at a time when demand is off.

The reason's simple. Lower wage scales allow foreign producers to sell their wares here for 5 to 25 per cent under the American quotation. T. E. Veltfort, managing director of the Copper & Brass Research Association, New York, gives these examples: Certain types of copper tubing sell for 12 to 15 cents a pound less than their U. S. equivalents; brass tubing is 21 cents a pound cheaper; welding rods are 16 cents a pound cheaper.

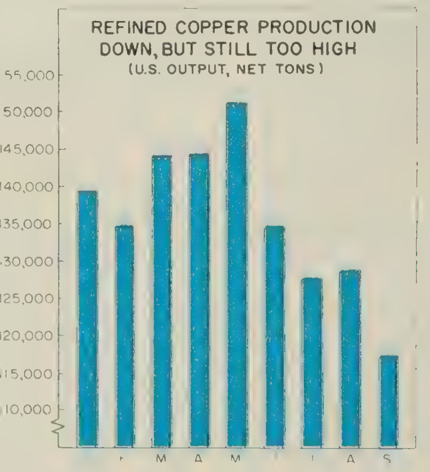
Those prices have wooed many customers away from domestic mills. For example: Imports of seamless brass tubing came to only 0.96 per cent of the domestic market in 1950. But during the first half of this year, the figure jumped to 16 per cent. Copper sheets offer another example: Between 1950 and 1957 imports rose from 4.3 per cent to 8.9 per cent of the domestic market.

U. S. exports are falling. During the 1930-39 period, they were 5.44 per cent of domestic shipments, versus 0.66 per cent today.

Differential—American producers, paying an average hourly wage of $2.12 (1956 industry average), start off with three strikes against them when it comes to competing pricewise, says Mr. Veltfort. The 1955 wage rate table of the International Labor Office lists these hourly figures: U. S. average, $1.88; United Kingdom, 66 cents; Germany, 47 cents; France, 40 cents; Sweden, 90 cents; and Japan, 22 cents.

Solution? — Mr. Veltfort sees three possible remedies: 1. Establishment of quotas. 2. Increased tariffs. 3. A wage-cost equalization tax.

The quota system has several disadvantages, the main one being it might cause discrimination among importers and exporters, says Mr. Veltfort. Tariffs would have to be substantial before they would become effective. (During 1930-38, the average duty ran 9.8 cents a pound. Between 1950 and 1956 it dropped to 2 cents.)



Source: Copper Institute

The best system, believes Mr. Veltfort, is to work out a wage-cost equalization tax.

Metals Still Weak

Lack of demand, continued weakness in foreign prices, and the softness in the stock market hold back any noticeable strengthening in copper, lead, and zinc.

Copper—Orders run "poor" to "satisfactory." The 0.5 cent a pound price cut in custom smelted copper on Oct. 15 did little to stimulate demand. Further fluctuations would surprise no one in the trade. One bright spot: U. S. refined production fell about 11,000 tons in September (see chart); refined stocks dropped 16,118 tons to the 176,813 ton mark.

Lead—Several producers report demand is still off, making the price vulnerable. But at least one company says the 0.5 cent a pound price cut on Oct. 14 is stimulating an across-the-board pickup. A few buyers feel that prices have reached bottom.

Zinc — Estimates on business vary, but the over-all market remains extremely weak. There are more and more reports of price shading, discounts, and "special allowances." Prices could fall at any time, but the industry is hoping the line will be held until the Tariff Commission reaches a decision on an import tax.

Aluminum Notes

Primary producers turned out 1,239,010 tons of aluminum in the first nine months of this year, compared with 1,236,650 tons in the same period of 1956.

The government will take 59,500 tons of aluminum in 1958's first quarter for Defense Department and Atomic Energy Commission needs. The tonnage is slightly less than that taken in this year's fourth quarter.

NONFERROUS PRICE RECORD

	Price Oct. 23	Last Change	Previous Price	Sept. Avg	Aug. Avg	Oct., 1956 Avg
Aluminum ..	28.10	Aug. 1, 1957	27.10	28.100	28.100	27.100
Copper	25.50–27.00	Oct. 15, 1957	26.00–27.00	26.469	28.639	38.365
Lead	13.30	Oct. 14, 1957	13.80	13.800	13.800	15.800
Magnesium .	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	64.500
Tin	91.25	Oct. 23, 1957	91.125	93.422	94.259	105.981
Zinc	10.00	July 1, 1957	10.50	10.000	10.000	13.500

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 26.00; ingots, 28.10, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 29.90; No. 43, 29.70; No. 195, 31.30; No. 241, 31.50; No. 356, 29.90, 30-lb ingots.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment data, f.o.b. shipping point.

Bismuth: $2.25 per ton, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.00 per lb for 550-lb keg; $2.02 per lb for 100 lb case; $2.07 per lb under 100 lb.

Columbium: Powder, $120 per lb, nom.

Copper: Electrolytic, 27.00 deld.; custom smelters, 25.50; lake, 27.00 deld.; fire refined, 26.75 deld.

Germanium: First reduction, $179.17-197.31 per lb; intristic grade, $197.31-220 per lb, depending on quantity.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $86-110 nom. per troy oz.

Lead: Common, 13.30; chemical, 13.40; corroding, 13.40, St. Louis. New York basis, add 0.20.

Lithium: 98 + %, 50-100 lb, cups or ingots $12; rod, $15; shot or wire, $16. 100-500 lb, cups or ingots, $10.50; rod, $14; shot or wire, $15, f.o.b. Minneapolis.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 12 in. sticks, 59.00 f.o.b. Madison, Ill.

Magnesium Alloys: AZ91A (diecasting), 40.75 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $232-235 per 76-lb flask.

Molybdenum: Unalloyed, turned extrusions, 3.75-5.75 in. round, $9.60 per lb in lots of 2500 lb or more, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, 74.50; "F" nickel 5 lb ingots in kegs for addition to cast iron, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter, 71.25 per lb of nickel content before 1 cent freight allowance, f.o.b. Copper Cliff, Ont.

Osmium: $80-100 per troy oz. nom.

Palladium: $21-24 per troy oz.

Platinum: $81-87 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $118-125 per troy oz.

Ruthenium: $45-55 per troy oz.

Selenium: $10.50 per lb, commercial grade.

Silver: Open market, 90.625 per troy oz.

Sodium: 16.50, c.l.; 17.00 l.c.l.

Tantalum: Rod, $60 per lb; sheet, $55 per lb.

Tellurium: $1.65-1.85 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot and prompt, 91.25.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max.), $2.25; grade A-2 (0.5% Fe max.), $2.00 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $3.50 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $4.10-4.20.

Zinc: Prime Western, 10.00; brass special, 10.25; intermediate, 10.50, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 11.35; special high grade, 11.75 deld. Die casting alloy ingot No. 3, 14.25; No. 2, 15.25; No. 5, 14.75 deld.

Zirconium: Sponge, commercial grade, $5-10 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 23.75-30.25; No. 12 foundry alloy (No. 2 grade), 21.75-23.00; 5% silicon alloy, 0.60 Cu max., 25.50-26.00; 13 alloy, 0.60 Cu max., 25.50-26.00; 195 alloy, 24.75-26.75; 108 alloy, 22.25-23.00. Steel deoxidizing grades, notch bars, granulated or shot; Grade 1, 23.75; grade 2, 22.00; grade 3, 20.75; grade 4, 19.00.

Brass Ingot: Red brass, No. 115, 26.75; tin bronze, No. 225, 36.00; No. 245, 30.25; high-leaded tin bronze, No. 305, 30.75; No. 1 yellow, No. 405, 22.00; manganese bronze, No. 421, 24.50.

Magnesium Alloy Ingot: AZ63A, 40.75; AZ91B, 37.25; AZ91C, 40.75; AZ92A, 40.75.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.82, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.80, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 32.355; l.c.l., 32.98. Weatherproof, 30,000-lb lots, 33.66; l.c.l., 34.78. Magnet wire deld., 40.43, before quantity discounts.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $19.00 per cwt; pipe, full coils, $19.00 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheets and strip, $9.50-15.95; sheared mill plate, $8.00-11.50; wire, $7.50-11.50; forging billets, $6.00-7.60; hot-rolled and forged bars, $6.15-7.90.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 24.00; ribbon zinc in coils, 20.50; plates 19.00.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R., strip, $15.00-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strip, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheets: 1100 and 3003 mill finish (30,000 lb base; freight allowed).

Thickness Range Inches	Flat Sheet	Coiled Sheet
0.249-0.136	43.10-47.60	....
0.135-0.096	43.60-48.70	40.50-41.10
0.095-0.077	44.30-50.50	40.60-41.30
0.076-0.061	44.90-52.80	40.80-42.00
0.060-0.048	45.60-55.10	41.40-43.10
0.047-0.038	46.20-57.90	41.90-44.50
0.037-0.030	46.60-62.90	42.30-46.30
0.029-0.024	47.20-54.70	42.60-47.00
0.023-0.019	48.20-58.10	43.70-45.40
0.018-0.17	49.00-55.40	44.30-46.00
0.016-0.015	49.90-56.30	45.10-46.80
0.014	50.90	46.10-47.80
0.013-0.012	52.10	46.80
0.011	53.10	48.00
0.010-0.0095	54.60	49.40
0.009-0.0085	55.90	50.90
0.008-0.0075	57.50	52.10
0.007	59.00	53.60
0.006	60.60	55.00

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	42.70	47.50
5050-F	43.80	48.60
3004-F	44.80	50.50
5052-F	45.40	51.20
6061-T6	46.90	53.00
2024-T4*	50.60	57.40
7075-T6*	58.40	66.00

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	78.20	75.20	....	....
0.156-0.172	66.20	63.40	....	....
0.188	66.20	63.40	....	81.60
0.219-0.234	63.00	61.50	....	....
0.250-0.281	63.00	61.50	....	77.90
0.313	63.00	61.50	....	74.20
0.344	62.50	....	....	....
Cold-Finished				
0.375-0.547	62.50	61.30	74.80	69.80
0.563-0.688	62.50	61.30	71.10	65.50
0.719-1.000	61.00	59.70	64.90	61.70
1.063	61.00	59.70	....	59.60
1.125-1.500	58.60	57.40	62.80	59.60
Rolled				
1.563	57.00	55.70	....	....
1.625-2.000	56.30	54.90	....	57.50
2.125-2.500	54.80	53.40	....	....
2.563-3.375	53.20	51.70	....	....

Forging Stock: Round, Class 1, 45.20-58.60 in specific lengths, 36-144 in., diam. 0.375-8 in. Rectangles and squares, Class 1, 50.50-66.60 in random lengths, 0.375-4 in. thick, width 0.750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
¾	$19.40	2	$ 59.90
1	30.50	4	165.05
1¼	41.30	6	296.10
1½	49.40	8	445.55

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	45.40-47.00	60.60-64.80
12-14	45.70-47.20	61.30-65.80
15-17	45.90-47.90	62.50-67.50
18-20	46.50-48.30	64.50-70.10

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Thread plate, .188 in., 71.70; .250-2.00 in., 70.60. Tooling plates, .250-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots.)
Aluminum: 1100 clippings, 13.50-14.00; old sheets, 10.50-11.00; borings and turnings, 6.50-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	49.13b	46.36c	....	49.32	23.000	23.000	22.250
Yellow Brass	43.02	31.30d	43.56	45.93	17.375	17.125	15.750
Low Brass, 80%	45.50	45.44	46.04	48.31	19.500	19.250	18.750
Red Brass, 85%	46.37	46.31	46.91	49.18	20.250	20.000	19.500
Com. Bronze, 90%	47.78	47.72	48.32	50.34	21.000	20.750	20.000
Manganese Bronze	51.01	45.11	55.61	....	16.125	15.875	15.375
Muntz Metal	45.39	41.20	....	....	16.375	16.125	15.625
Naval Brass	47.27	41.58	54.33	50.68	16.125	15.875	15.375
Silicon Bronze	53.76	52.95	53.80	55.74e	22.625	22.375	21.625
Nickel Silver, 10%	59.43	61.75	61.75	....	23.625	23.375	11.813
Phos. Bronze, A-5%	68.07	68.57	68.57	69.75	23.750	23.500	22.500

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, or any or all kinds of scrap, add 1 cent per lb.

7.00; crankcases, 10.50-11.00; industrial castings, 10.50-11.00.

Copper and Brass: No. 1 heavy copper and wire, 18.50-19.00; No. 2 heavy copper and wire, 17.00-17.50; light copper, 15.00-15.50; No. 1 composition red brass, 16.00-16.50; No. 1 composition turnings, 15.50-16.00; new brass clippings, 13.50-14.00; light brass, 9.50-10.00; heavy yellow brass, 11.50-12.00; new brass rod ends, 12.50-13.00; auto radiators, unsweated, 12.00-12.50; cocks and faucets, 12.50-13.00; brass pipe, 13.00-13.50.

Lead: Heavy, 9.00-9.50; battery plates, 4.00-4.25; linotype and sterotype, 11.00-11.50; electrotype, 9.50-10.00; mixed babbitt, 10.50-11.00.

Monel: Clippings, 33.00-35.00; old sheets, 30.00-32.00; turnings, 22.00-25.00; rods, 33.00-35.00.

Nickel: Sheets and clips, 50.00-55.00; rolled anodes, 50.00-55.00; turnings, 45.00-50.00; rod ends, 50.00-55.00.

Zinc: Old zinc, 3.00-3.25; new diecast scrap, 2.75-3.00; old diecast scrap, 1.50-1.75.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 16.50-17.50; 3003 clippings, 16.50-17.50; 6151 clippings, 16.00-17.50; 5052 clippings, 16.00-17.00; 2014 clippings, 15.50-17.00; 2017 clippings, 15.50-17.00; 2024 clippings, 15.50-17.00; mixed clippings, 15.00-16.00; old sheets, 13.50; old cast, 13.50; clean old cable (free of steel), 16.00-16.50; borings and turnings, 13.50-15.00.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 53.00; light scrap, 48.00; turnings and borings, 33.00.

Copper and Brass: No. 1 heavy copper and wire, 21.00; No. 2 heavy copper and wire, 19.50; light copper, 17.25; refinery brass (60% copper) per dry copper content, 18.75.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 21.00; No. 2 heavy copper and wire, 19.50; light copper, 17.25; No. 1 composition borings, 18.50; No. 1 composition solids, 19.00; heavy yellow brass solids, 13.00; yellow brass turnings, 12.00; radiators, 15.00.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 45.29; oval, 43.50, 5000-10,000 lb; electrodeposited, 35.75, 2000-5000 lb lots; cast, 36.25, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 109.50; 200-499 lb, 108.00; 500-999 lb, 107.50; 1000 lb or more, 107.00.

Zinc: Balls, 17.50; flat tops, 17.50; flats, 19.25; ovals, 18.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb in 100-lb drums.

Chromic Acid: 100 lb, 33.30; 500 lb, 32.80; 2000 lb, 32.15; 5000 lb, 31.80; 10,000 lb, 31.30; f.o.b. Detroit.

Copper Cyanide: 100-200 lb, 74.80; 300-900 lb, 72.80.

Copper Sulphate: 100-1900 lb, 14.55; 2000-5900 lb, 12.55; 6000-11,900 lb, 12.30; 12,000-22,900 lb, 12.05; 23,000 lb or more, 11.55.

Nickel Chloride: Less than 400 lb, 35.00; 400-9990 lb, 33.00; 10,000 lb, 32.50.

Nickel Sulphate: 5000-22,000 lb, 33.50; 23,000-35,900 lb, 33.00; 36,000 lb or more, 32.50.

Sodium Cyanide: 100 lb, 27.60; 200 lb, 25.90; 400 lb, 22.90; 1000 lb, 21.90; f.o.b. Detroit.

Sodium Stannate: Less than 100 lb, 73.70; 100-600 lb, 64.80; 700-1900 lb, 62.00; 2000-9900 lb, 60.20; 10,000 lb or more, 58.90.

Stannous Chloride (anhydrous): Less than 25 lb, 162.90; 25 lb, 127.90; 100 lb, 112.90; 400 lb, 110.40; 5200-19,600 lb, 98.20; 20,000 lb or more, 86.00.

Stannous Sulphate: Less than 50 lb, 125.80; 50 lb, 95.80; 100-1900 lb, 93.80; 2000 lb or more, 91.80.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(Concluded from Page 279)

within 80 to 90 per cent of capacity. Automotive lists close this week and expectations are that No. 1 grades will be off $5 or $6 a ton from prices a month ago. Quoted prices are nominal.

Buffalo—Prices on the principal grades of mill scrap, and on numerous specialties, were marked down an average of $2 a ton here last week. A further drop, possibly another $3, is anticipated next month unless the mills enter the market with substantial purchases. Cast scrap prices are steady.

Cincinnati—The scrap market is at a standstill. Stocks are piling up in dealers' yards, and the expected light mill buying won't make much dent in accumulations.

Birmingham—Prices held steady here last week, but few orders were placed by consumers. Dealers report little scrap is coming into their yards at current prices. They are reluctant to accept the prices offered them. The export market appears slightly stronger.

Seattle — Prices are steady at the lower levels attained a week or so ago. Business continues slow. Receipts at tidewater have declined.

Los Angeles—The market undertone is soft with domestic trading at a minimum and export business at a standstill. Further price reductions are anticipated.

San Francisco — Steel scrap is moving slowly here. There is little mill buying, and lower prices are expected the first of next month.

Washington—Domestic stocks of ferrous materials (scrap and pig iron) totaled 10,564,000 gross tons on Aug. 31, reports the U. S. Bureau of Mines. This was the largest quantity ever held by consumers. Scrap stocks accounted for 7,490,000 tons, and pig iron 3,074,000, each being up 7 per cent from the July 31 totals.

Domestic consumption of scrap and pig iron in August was 11,074,000 tons (5,302,000 tons scrap, 5,772,000 tons pig iron).

Scrap available for consumption in August totaled 5,771,000 gross tons, an increase of 7 per cent over July. Home scrap accounted for 3,342,000 tons, and purchases 2,429,000. Of the purchased scrap, 83 per cent came from dealers and 17 per cent from other sources.

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